Cruisers yachts

455 Series
Owner's Manual

455 Series Boats

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Section 1 – Introduction

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WELCOME ABOARD!!

Welcome to the Cruiser Yachts family of happy boat owners.

First off, we wish to thank you for making our **455 Series Boat** your recreational choice for boating enjoyment. Extensive design and engineering research went into the development of the **455 Series Boat**; and we feel that there is a beautiful balance between structural integrity and creature comforts.

You should know that your boat was manufactured by trained craftsmen in the tradition of meeting or exceeding existing safety and quality standards established by the U.S. Coast Guard and the Boating Industry of America.

Cruisers Yachts has been manufacturing boats for more than 50 years. We take pride in our craftsmanship and hull performance. We are confident you will enjoy the ride. For you, the **Cruisers Yachts** name is your assurance that your boat will hold its value while providing many years of boating pleasure. We have made a commitment to this industry and are glad to have you as a partner.

Congratulations on your choice – let us know if we can be of further service.

SKIPPER'S KIT

The Skipper's Kit contains the 455 Series owner's manual. Also included is information about onboard systems and components furnished by suppliers other than Cruisers Yachts.

Owner's Manual, 455 Series Boats

Spend some time looking through this manual. It contains information concerning the operation and care of your boat. The descriptions contained within the manual will introduce you to the features of the boat and provide you with a general knowledge of how the equipment works. The manual is divided into ten sections and each section is introduced by a table of contents to help you quickly find needed information. Become familiar with the material in each section before operating your boat.

Throughout the manual you will come across safety precautions labeled ⚠ WARNING or ⚠ CAUTION. **WARNINGS** indicate hazards or unsafe practices which could result in personal injury or death. **CAUTIONS** indicate situations which could result in damage to the boat and its various systems.

Section 1 contains a description of the Skipper's Kit and information about the warranty.

Section 2 contains boat specifications such as dimensions and capacities. There are also layout diagrams to introduce you to floorplans as well as the locations of various components.

Section 3 contains descriptions of all the controls and indicators on the dash of the helm.

Section 4 contains principles of operation for the major systems onboard the 455 Series Boats. Look in this section for electrical schematics.

Section 5 contains instructions for operating the boat. The section begins with safety information which is "must" reading.

Section 6 contains maintenance instructions for services that need to be performed on a regular basis.

Section 7 contains instructions for storing the boat for extended periods of time and prep instructions for after storage.

Section 8 contains information about the care of your boat, and how to repair minor damage.

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Section 9 contains information about the standard and optional accessory items which complement your new Cruisers Yachts boat.

Section 10 contains a brief troubleshooting section.

Owner's Manuals for Onboard Systems and Components

Spend some time becoming familiar with all the information contained in the Skipper's Kit. Besides containing separate warranty information, the kit contains manuals and pamphlets which provide important safety, operating and maintenance instructions for those systems and components not manufactured by Cruisers Yachts. Depending on the options you chose the kit may contain some or all of the following manuals:

AVAILABLE FEATURES

- Engine Operation/Maintenance
  - Electric Schematic
- Hydraulic Steering Manual
- RACOR Fuel Filter/Water Separator
- Electric Stove
- Battery Charger Manual
- Water Heater Manual
- Trim Tabs Manual
- Refrigerator/Freezer User Manual
- Generator Operation/Maintenance
  - Electrical Schematics
  - Service Centers Directory
- Electric Anchor Windlass Operation/Maintenance Manual
- Air Conditioner Information Packet
- Stereo System Operation Manual
- Compass Manual
- Microwave User Manual
- Marine Toilet Manual
- Fire Suppression System Information
- Carbon Monoxide (CO) Detector Handbook
- Ice Maker Manual
- Shaft Logs Manual
- Washer/Dryer Manual
- Bow Thruster Manual
- Hydraulic Swim Platform Manual
- Central Vacuum Manual
- Spotlight Operation Manual

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WARRANTY INFORMATION

Warranties for onboard systems and components furnished by suppliers other than Cruisers Yachts are located inside the Skipper's Kit. Your Cruisers Yachts Dealer will go through these with you. It is your responsibility to fill out any warranty registration that may be required.

The warranty provided by Cruisers Yachts is printed on the last page of this manual. You and the Cruisers Yachts Dealership have certain responsibilities to fulfill to keep the warranty in force.

Dealership Responsibilities

1. The dealer will discuss the terms of all warranties, and stress the importance of registering warranties with the appropriate manufacturers.
2. The dealer will provide instruction for obtaining warranty service.
3. The dealer will go over the predelivery service record with you and then sign it to certify that all work has been accomplished.
4. The dealer will provide you with thorough instructions in the operation of your boat and all its systems.

Your Responsibilities

1. Sit down with the dealer and go over all warranties. Fill in the Cruisers Yachts Limited Warranty Registration Card which is located inside the Skipper's Kit. Keep a record of the hull number for future reference.

2. Inspect the boat at the time of delivery to ensure that all systems are operating properly.

3. Sit down with the dealer and go over the predelivery service record. Sign this record to indicate that it has been explained to you.

4. Operate all equipment per the manufacturer's instructions.

5. Cruisers Yachts recommends that you refer to your engine warranty for initial inspection and service requirements.

6. Perform or provide for the appropriate periodic maintenance outlined in the owner's manuals and service guides.

Warranty Service

You are entitled to all the benefits and services set down in the warranties. If a problem arises with your Cruisers Yachts boat as a result of workmanship or materials, contact your Cruisers Yachts dealer as soon as possible. Please have your hull identification number and necessary model numbers on hand for the items that may need service or repair. Your hull identification number is located below the rub rail on the starboard side of the transom.

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Section 2 – Specifications and Layout

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SPECIFICATIONS

Measurements

L.O.A. Hull with Standard Swim Platform ..... 45'6" / 13.9 m
L.O.A. Hull with Optional High/Low Swim Platform ..... 48'0" / 14.6 m
Beam ..... 15'4" / 4.7 m
Approximate Weight, Diesel Engines (lbs) ..... 34,000 / 15,300 kg
Fuel Capacity (U.S. Gallons) ..... 500 / 1890 L
Water System Capacity (U.S. Gallons) ..... 135 / 511 L
Holding Tank Capacity (U.S. Gallons) ..... 100 / 377 L
Cabin Headroom (minimum) ..... 6'5" / 1.9 m
Height - Keel to Top of Windshield ..... 14'9" / 4.5 m
Height - Keel to Top of Arch ..... 17'7" / 5.2 m
Draft: Hull / with Engine ..... 33"/39" / 0.85 / 0.99 m
Bridge Clearance (w/Arch) ..... 15'4" / 4.7 m
Sleeping Accommodations ..... 8 persons

ENGINES: DIESEL

Yanmar
T 6CX-GTE Yanmar Diesels, 465 HP

Volvo
T TAMD75P Volvo Diesel, 480 HP

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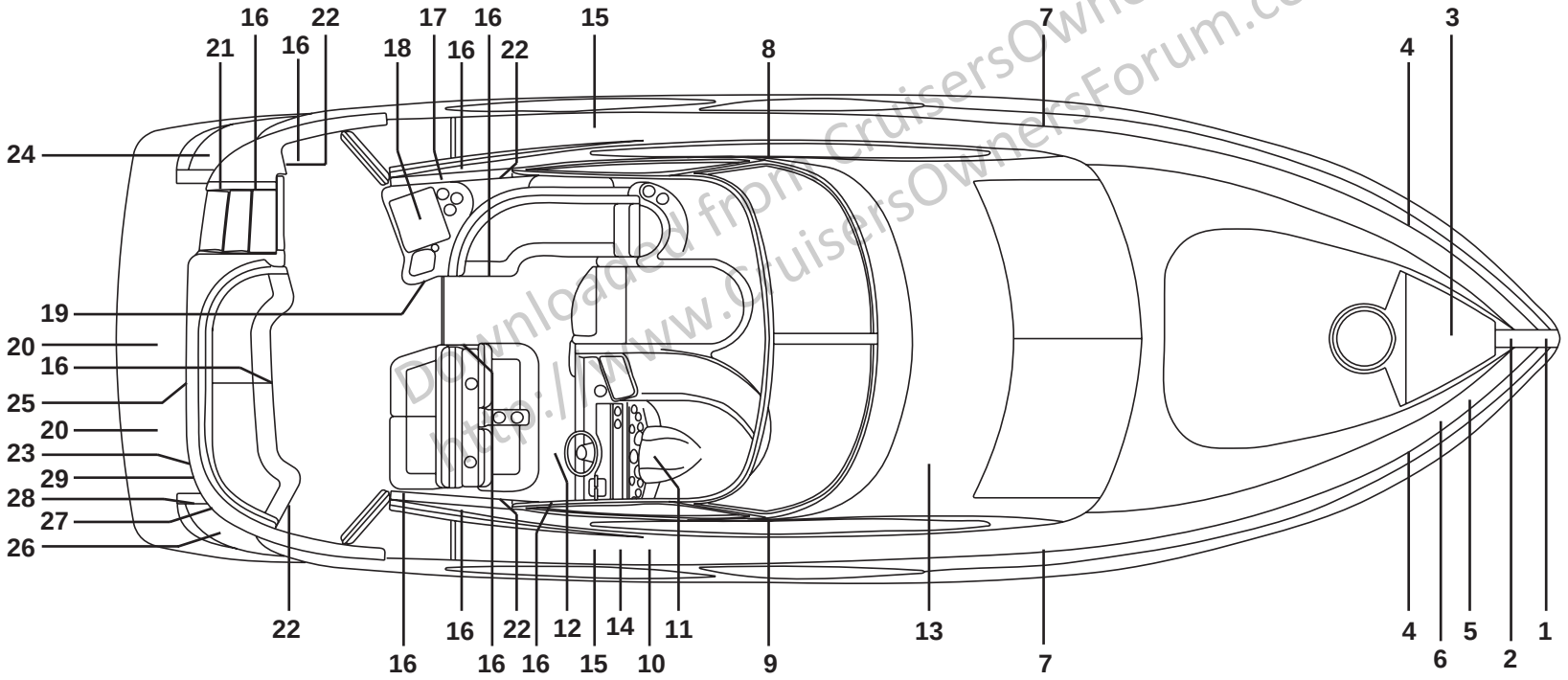
GENERAL LAYOUT - Deck Hardware

1. Spotlight
2. Recess Anchor Roller
3. Ropelocker/Windlass
4. Bow Cleat
5. Windlass Deck Switch (Out)
6. Windlass Deck Switch (In)
7. Amidship Cleat
8. Port Navigation Light
9. Starboard Navigation Light
10. Forward Waste Deck Plate
11. Compass
12. Helmstation
13. Horn
14. Aft Waste Deck Plate
15. Fuel Fill
16. Courtesy Lights
17. AC Outlet GFI
18. Wetbar
19. Storage
20. Fender Storage
21. Cockpit Washdown
22. Speaker
23. City Water
24. Water Deck Plate
25. Stern Light
26. Shore Power Retractor
27. Shore Power Cord Switch
28. Phone/TV Jack
29. Cockpit Shower



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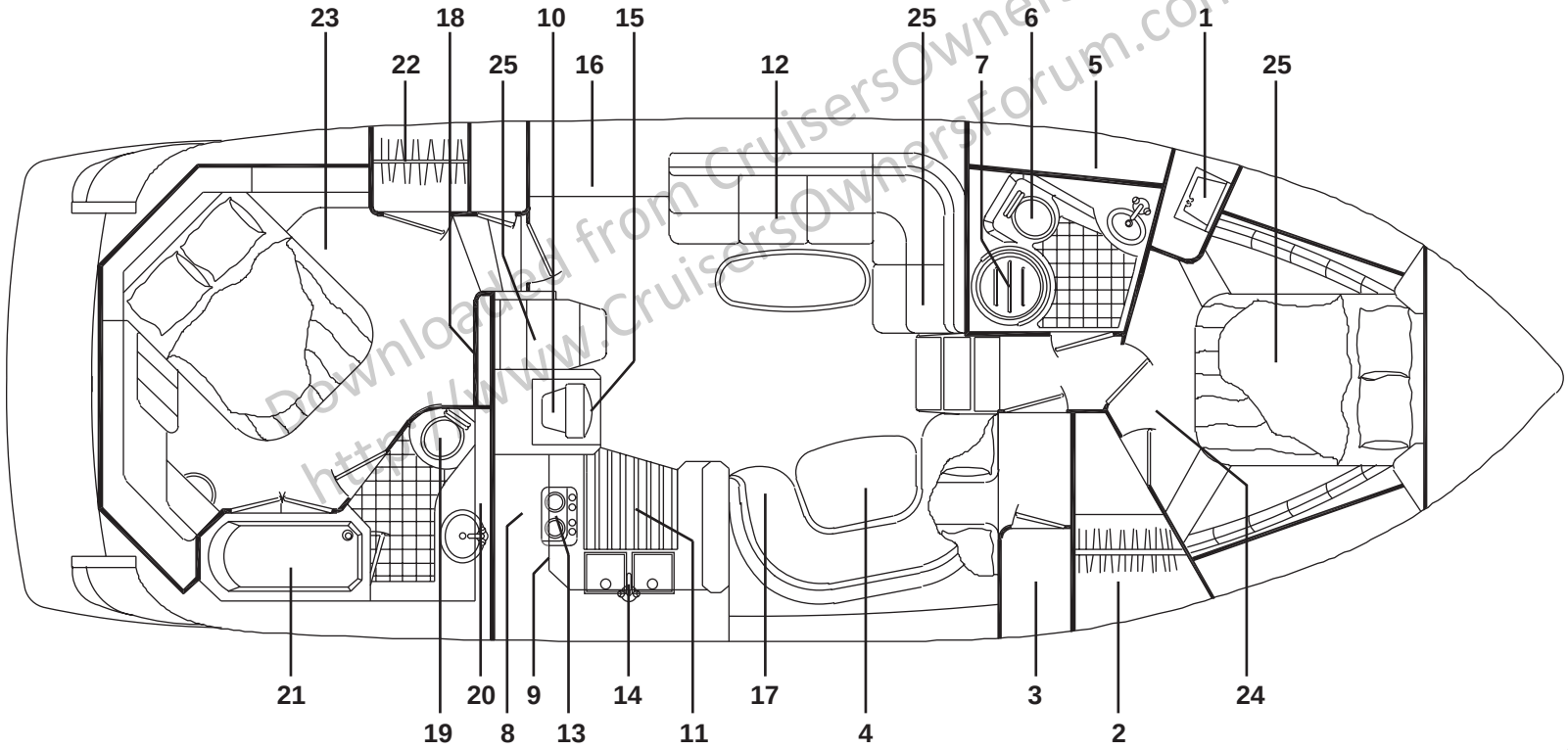
GENERAL LAYOUT - Interior

1. FSR TV
2. FSR Closet
3. Washer/Dryer
4. Dinette
5. Forward Vanity
6. Forward Head Unit
7. Forward Shower
8. Microwave
9. Coffee Maker
10. Refrigerator
11. Galley
12. Salon
13. Stove
14. Galley Sink
15. Salon TV
16. AC/DC Panel
17. Vacuum
18. MSR TV
19. MSR Head Unit
20. MSR Head Vanity
21. MSR Head Shower and Tub
22. MSR Closet
23. Master Stateroom
24. Forward Stateroom
25. Air Conditioning Unit



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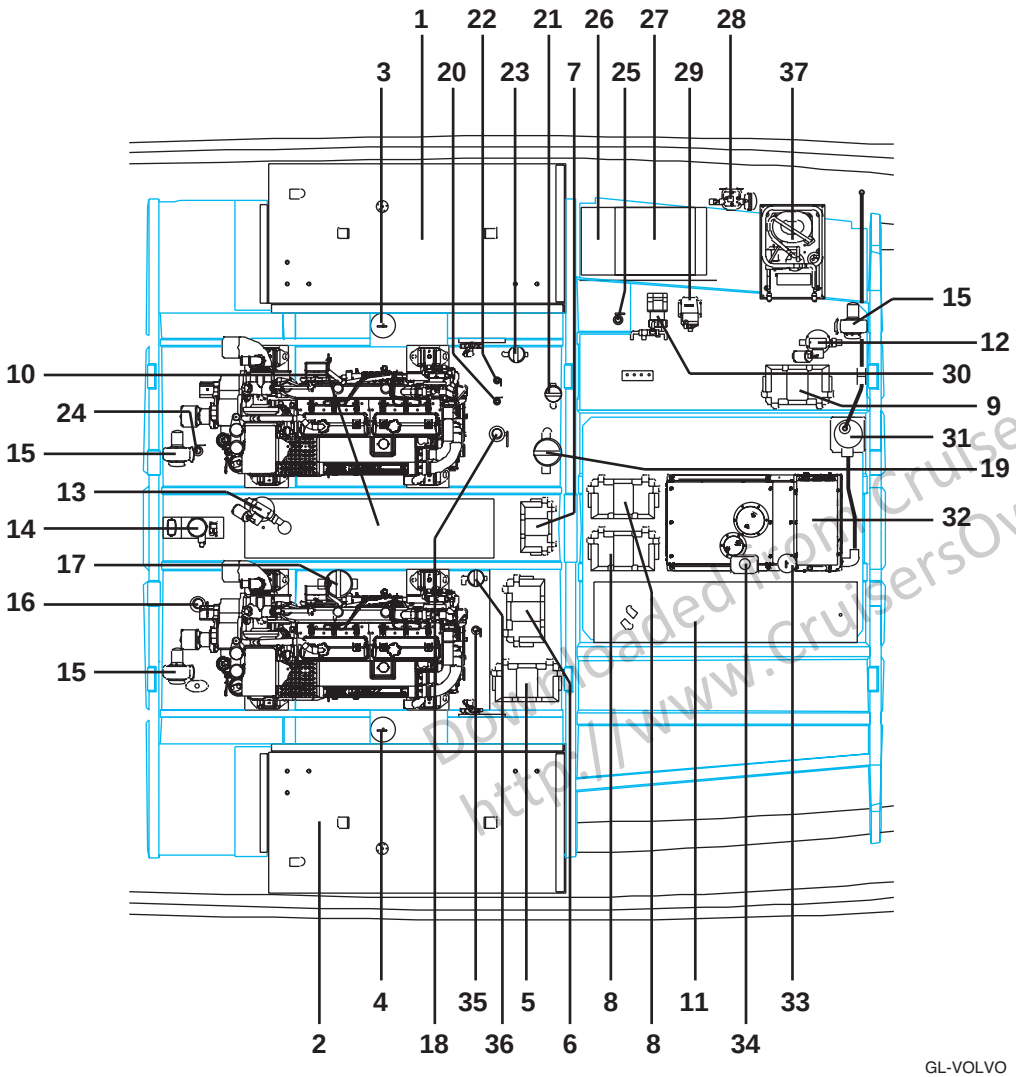
GL-INTERIOR

GENERAL LAYOUT - VOLVO



1. Port Fuel Tank
2. Starboard Fuel Tank
3. Port Fuel Filter
4. Starboard Fuel Filter
5. Starboard Engine Battery
6. Port Engine Battery
7. Generator Battery
8. House Battery
9. Bow Thruster Battery
10. Aft Waste Tank
11. Forward Waste Tank
12. Forward Waste Macerator
13. Aft Waste Macerator
14. Bilge Pump and Float Switch
15. Engine Room Blower
16. Starboard Engine Seacock
17. Starboard Engine Strainer
18. Port Engine Seacock
19. Port Engine Strainer
20. Cockpit A/C Seacock
21. Cockpit A/C Strainer
22. A/C Seacock
23. A/C Strainer
24. Aft Waste Seacock
25. Forward Waste Seacock
26. Hot Water Heater (20 Gallon)
27. Hot Water Heater (11 Gallon)
28. Water Pump
29. Cockpit A/C Pump
30. A/C Pump
31. Generator Muffler
32. Generator Unit
33. Generator Fuel Filter
34. Generator Overflow Bottle
35. Generator Seacock
36. Generator Strainer
37. Cockpit A/C Unit

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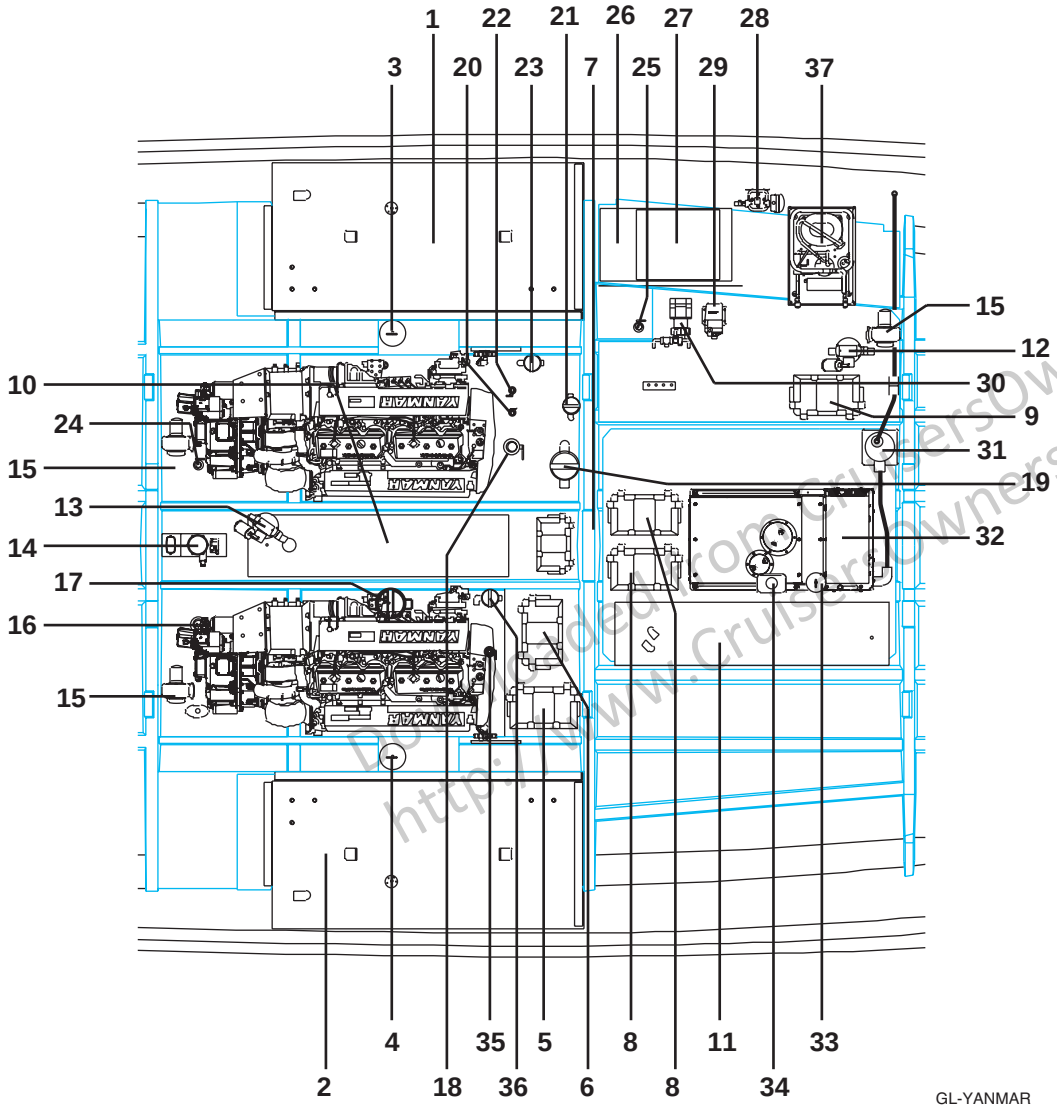
GENERAL LAYOUT - YANMAR



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DASH LAYOUT

Key to Dash Layout

1 - TRANSMISSION OIL PRESSURE GAUGES

The port gauge is a transmission oil pressure gauge for the port engine transmission, and the starboard gauge is a transmission oil pressure gauge for the starboard engine transmission. The transmissions are hydraulically operated and ideally should read between 300 and 320 psi. Small fluctuations are normal, but major variations may indicate trouble. If pressure changes radically, shut engines off and see your Cruisers Yachts Dealer.

2 - FUEL GAUGES

IMPORTANT

Do not rely on the accuracy of gauges. Readings are only approximate and should always be compared to the hours of use multiplied by the known fuel consumption (GPH).

The port gauge is the port fuel tank gauge and the starboard gauge is the starboard fuel tank gauge. The gauges indicate the approximate amount of fuel in each tank.

3 - VOLVO DISPLAY SCREEN

See the Volvo display screen owner's manual that is included in the Skipper's Kit for a detailed description of the functions.

4 - RUDDER ANGLE INDICATOR

The rudder angle indicator shows the position of the rudder in relation to the centerline of the boat. This instrument is used to aid in low speed maneuvering. Since a yacht of this size responds slowly to the rudder at slow speeds, the rudder angle indicator gives a quick reference to the amount of rudder being used in a turn.

5 - COMPASS

The compass has not been compensated. The compensating should be performed by a qualified compass adjuster. After the compass has been adjusted, do not allow any iron or steel objects to be placed in its vicinity - even temporarily. Refer to the owner's manual included in the Skipper's Kit for detailed information.

6 - DEPTH FINDER

The depth finder can be turned ON by pushing the top of the adjacent accessory switch.

7 - FIRE SUPPRESSION DISPLAY UNIT

The display unit has an indicator lamp to indicate fire suppression automatic fire extinguisher status. The lamp should glow when the ignition switch is in the "ON" position indicating a charged system. Should the system discharge, the lamp will not glow. See Fire Suppression owner's manual in the Skipper's Kit for complete details.

8 - SEAKEY EMERGENCY PANEL

See the SeaKey owner's manual that is included in the Skipper's Kit for a detailed description of the functions.

9 - SPOTLIGHT CONTROLS

The spotlight is controlled from a joystick keypad mounted at the helm.

SLOW - Press SLOW once to select slow light movement. Press it again to turn light off.

FAST - Press FAST to select fast light movement. Press it again to turn light off.

DIRECTIONAL MOVEMENT - The center lever is moved left, right, fore and aft to move the light beam.

AUTO SWEEP - With the light on, pushing this button will sweep the light in about a 90 degree arc automatically. Press again to stop sweep.

SOS/DISTRESS - Press and hold for about 5 seconds to automatically flash "SOS" in International Morse Code. The light will sweep horizontally while flashing. Press again to stop SOS flashing.

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10 - THROTTLE CONTROLS

The throttle control lever for the port engine is the port side lever and the throttle control lever for the starboard engine is the starboard lever. NEUTRAL is at the center, FORWARD is forward (away from you) one detent and REVERSE is aft (toward you) one detent. Gradually push forward to go into FORWARD and continue to push FORWARD to increase engine speed. Gradually pull aft to go into REVERSE and continue to pull toward you to increase engine speed. Always return the controls to NEUTRAL when the engines are not running.

11 - TRIM TAB CONTROLS

IMPORTANT

Push the trim tab rocker switches in half second bursts. Holding the rockers down too long will over trim the boat.

The trim tab rocker switches are used to correct the trim of you boat while you are underway. To trim the bow of your boat down, push the top halves of both switches. To trim the bow of your boat up, push the bottom halves of both switches. Refer to Suggested Operating Techniques in Section 5 for detailed information.

12 - KEYPAD

The keypad and all of its functions are explained in the following pages.

13 - EVC PANEL

The EVC panel is used in conjunction with the electronic engine controls. It must be energized before the engines are started. This panel provides neutral warm-up functions. Please refer to the Volvo or Yanmar owner's manual for detailed operator instructions.

14 - STEERING WHEEL

The steering wheel is hydraulically linked to the rudders for ease of operation.
See Section 4, Principles of Operation for detailed information on the steering system.

15 - VHF RADIO

See the Raymarine owner’s manual that is included in the Skipper’s Kit for a detailed description of the functions.

16 - 12 VOLT OUTLET

This receptacle provides 12 volt DC power to portable accessories such as cellular telephones.

17 - ELECTRONIC VESSEL CONTROL (EVC) WARNING ALARM

The EVC warning alarm emits a warning for the EVC system.

18 - STEREO REMOTE

Allows the stereo to be controlled from the helm station. There are stereo remotes located throughout your boat to make stereo control easier.

19 - BOW THRUSTER (OPTIONAL)

Push the bow thruster joystick control to either the port or starboard side and the bow of the boat will move accordingly. This is to aid in the docking of your yacht.

20 - HIGH WATER ALARM

The alarm will sound when the high water alarm float switch is activated.

YANMAR TELEFLEX DISPLAY SCREEN

See the Teleflex display screen owner’s manual that is included in the Skipper’s Kit for a detailed description of the functions.

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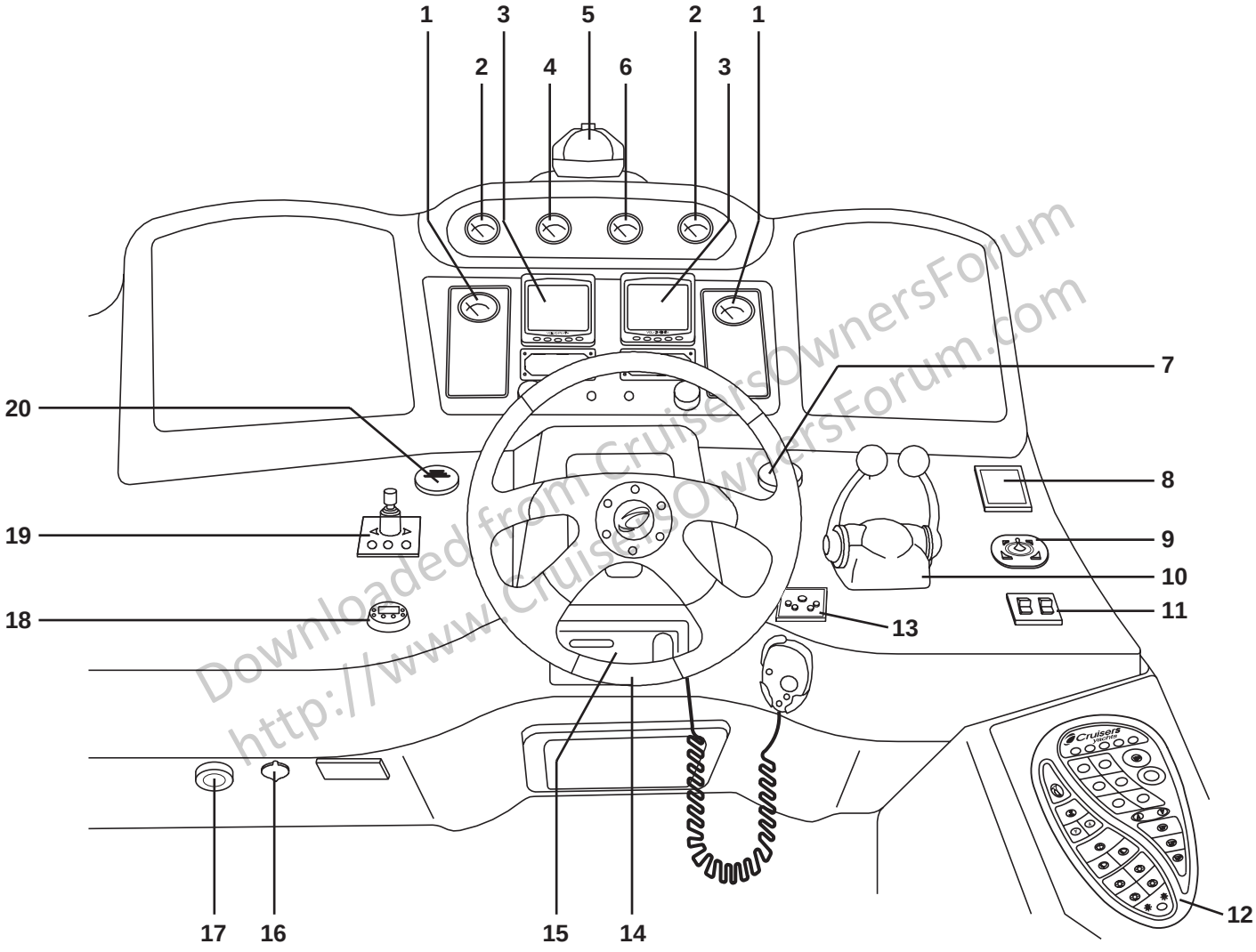
VOLVO DASH LAYOUT



VOLVO DASH

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KEYPAD SWITCH FUNCTIONAL DESCRIPTION

Keypad Layout

1 - HORN

The HORN button is a momentary button controlling the horn. The horn will sound as long as the button is pressed.

2 - AFT/MID/FORWARD PUMP

These three buttons are toggle action buttons, push to turn on, push to turn off. They control the respective pumps. The indicator LEDs will illuminate when power is being supplied to the corresponding pump.

3 - PORT/STARBOARD WIPER

These are toggle action buttons that control the wipers. Pressing a button will turn on a wiper in the low speed mode. Pressing it a second time will turn it on in the high speed mode. Pressing it a third time will turn the wiper off and park the wiper. The LEDs indicate if the wiper is on and the speed mode of the wiper.

4 - PORT/STARBOARD WASHER

The WASHER button is a momentary action. The washer will stay on as long as the button is pressed. If a wiper is not on, the WASHER button will energize the wiper in low speed. The system has an off-delay function for the wiper(s) that were energized by the WASHER button allowing the wiper(s) to stay on for several cycles and then park. If a wiper was on prior to the washer cycle, it will remain on at its commanded speed both during and after the washer cycle. The water for the washer system is supplied from the freshwater system

5 - SPREADER/ENGINE ROOM LIGHTS

These buttons are toggle action buttons that control the corresponding lights. When a button is pressed, the corresponding light(s) will turn on. When it is pressed again, the light(s) will turn off.

6 - ANCHOR/NAV LIGHTS

Pressing the ANCHOR/NAV light button turns on the Navigation light. Pressing it a second time turns the Navigation light off and the Anchor lights on. Pressing it a third time turns them both off.

7 - COCKPIT LIGHTS

The cockpit lights can be controlled from the keypad or from the transom and salon momentary switches.

Pressing the COCKPIT lights button will turn the cockpit lights on. Pressing this button while the lights are on will start a 5-minute timer. After the 5-minute time elapses, the lights will automatically turn off. Pressing the button while the cockpit lights are in the timer state will turn the lights off. If the lights turn off due to the 5 minutes elapsing and the button is pushed again, the lights will turn on, repeating the cycle. The cockpit lights are also controlled by momentary rocker switches that are located at the transom and salon entrances. These switches emulate the keypad COCKPIT lights button logic.

8 - BOARDING LIGHTS

The boarding lights can be controlled from the keypad.
The boarding lights will toggle ON when the BOARDING button on the keypad is pressed. They will toggle OFF when the button is pressed again.

9 - ENGINE ROOM FANS

This button has a toggle action. Push the button to turn the fans on, push it again to turn the fans off.

10 - WINDLASS POWER

The WINDLASS POWER button is a toggle action function. Push the WINDLASS POWER button to turn windlass power on. The indicator will turn on when windlass power is on. When the windlass power indicator is on, pushing the up or down arrows will cause the windlass to go up or down.

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11 - BATTERY PARALLEL

This is a momentary function that controls the battery parallel solenoid. When this button is pressed, the battery parallel solenoid is energized, connecting the two cranking batteries in parallel. When it is released, the solenoid is de-energized. This function should be used only when one of the cranking batteries is not charged sufficiently to start the corresponding engine.

12 - KEYLESS OPERATION

Security is provided by using a keyless control to enable engine functions. Key in the four-digit user code followed by the ENTER button. The ENTER button also serves as a reset button if an error is made entering the four-digit code. Simply press the ENTER button and start over.

CAUTION

Each key press must be within three seconds of each other or the keypad will reset.

13 - ENGINE IGNITION START/STOP

Successfully entering the correct four-digit user code and pressing the ENTER button will unlock the ignition system. At this point the PORT and STBD ENGINE IGN buttons are enabled (active). When the system is unlocked, a 15-minute timer begins. When the 15 minutes elapses, the system will automatically lock if no further ignition function buttons are pressed. Pressing either engine ignition button will toggle the corresponding master engine ignition relay on and its indicator will light.

14 - DIM

The DIM arrows control the light level of the keypad LEDs and back-lighting, and other helm lights. Pressing the up arrow will increase the light level. Pressing the down arrow will decrease the light level.

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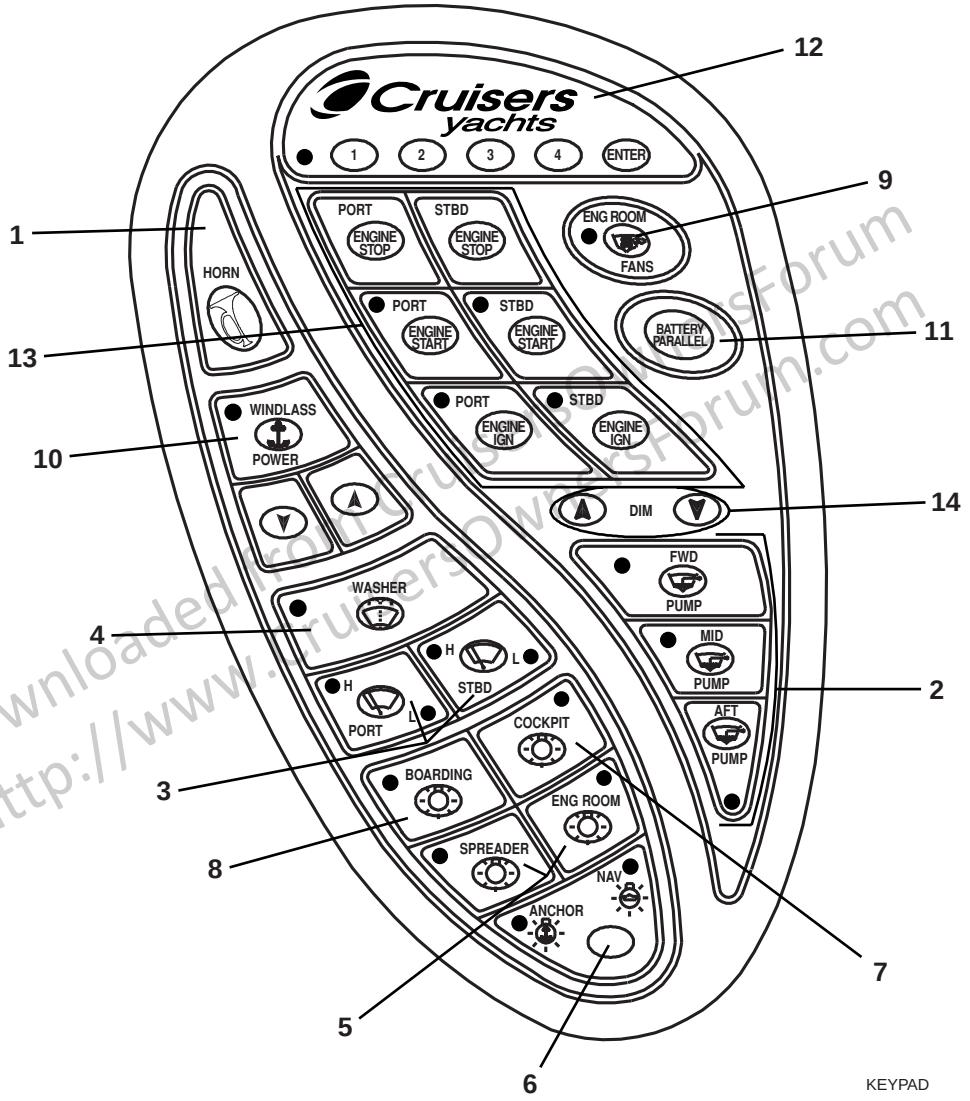
KEYPAD



KEYPAD

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Section 4 – Principles of Operation

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POWER TRAIN

The power generated by the engine is transmitted to the propeller via the transmission, shaft coupling and the propeller shaft assembly. The propeller shaft is supported and aligned with the engine by a through-hull shaft log and an outside strut.

Engines

Your boat is powered by twin inboard engines. All operation, specification and maintenance information is contained in the engine owner's manual. Find this manual, which is located in the Skipper's Kit, and familiarize yourself with it. The engine is the heart of your boat and following the manufacturer's recommendations will provide you with continued boating pleasure.

COOLING SYSTEM

CAUTION

The cooling system starts at the cooling water seacock, which can be shut off for a number of reasons. Make sure the seacocks are open before starting engines. The absence of cooling water will cause the engines to overheat and cause irreparable damage.

Each engine is cooled by seawater entering the boat through a seacock in the hull bottom. The water enters the engine through the engine water jacket and is returned to the sea through the exhaust system.

A feature which is standard on diesel engines is the freshwater cooling system. This system uses the incoming seawater to cool a secondary closed-cooling system. The seawater flows through an engine mounted heat exchanger, cools the closed system coolant and is returned to the sea via the exhaust system.

ALARM SYSTEMS

Alarm systems are on all boats. The alarm will sound under the following conditions:

- Engine temperature exceeds specified limits.
- Engine oil pressure drops below specified limits.
- Transmission oil temperature exceeds specified limits.
- Ignition switches are "ON," engines are "OFF."

To test the alarm system, turn the ignition switch to the "ON" position. Depending upon the engine, the alarm may sound immediately or after a few seconds delay.

Engine Ignition Start/Stop

Successfully entering the correct keyless code then pressing the ENTER button will unlock the system. At this point the PORT ENGINE IGN and STBD ENGINE IGN buttons are enabled. When the system is unlocked, a 15-minute timer begins. If the system senses that either or both engines are running or rotating during the 15-minute period, the timer is reset and turned OFF. If neither engine starts during the 15-minute period, the system will lock. It will then be necessary to re-enter the user code to unlock the system and enable starting the engines.

With the system unlocked, pressing either ENGINE START button will toggle the corresponding master engine ignition circuit ON, and the corresponding indicator will light. The 15-minute counter is reset each time one of the six buttons which control the engine ignition is pressed. When the 15-minute time elapses, and the tachometer inputs are not detecting button activity or an engine running, the system will automatically turn the master ignition circuits OFF and lock the system.

If an ENGINE START indicator is ON, the corresponding ENGINE START button is enabled. The ENGINE START indicator will light when the engine tachometer signal is sensed, indicating engine rotation. It is

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important to note that the indicator does not indicate when the engine is successfully started but simply that the crank shaft is rotating. The indicator will remain ON as long as the system is receiving the signal from the engine tachometer. At this point the 15-minute timer and further actuation of the engine ignition button is disabled. The 15-minute timer is disabled as long as one or both engines are running. If both engines are not running and none of the ENGINE START/IGN buttons are pressed, the timer is restarted and the system will lock when the 15-minute time elapses.

When an engine is running, pressing and holding the ENGINE STOP button will turn the corresponding master engine ignition OFF. The ENGINE STOP button is a momentary button and needs to be held in until the engine is stopped.

The system can be locked, only if the engines are OFF, by entering either the user code or the master codes correctly and pressing the ENTER button. The system will automatically lock after the 15-minute time out period, if no engine rotation occurs. The engine ignition circuits that are ON at this time will automatically be turned OFF.

Reprogramming the User Code

The following is a description of how to program/reprogram the four-digit user code.

1. Type in your four-digit code.
   Caution: *Do not press ENTER*
2. Simultaneously press 1 and 4. If the code was entered correctly the LED, adjacent to 1, will blink approximately twice a second, otherwise the LED will remain off.
3. Type in the new four-digit code, once to enter the code then once to verify, without pressing the ENTER button in between.
   Ex. If the desired code is 1, 2, 3, 4 then the user will type in 1, 2, 3, 4, 1, 2, 3, 4. If done correctly upon pressing the final verification digit the system will unlock and the unlock LED will remain illuminated.
   Caution: *Each key press must be within three seconds of each other or the keypad will reset.*

Transmission

Through a series of gears, the transmission transmits the motive force of the engine to the propeller. The transmission has one forward and one reverse speed and is shifted by the transmission selector on the dash.

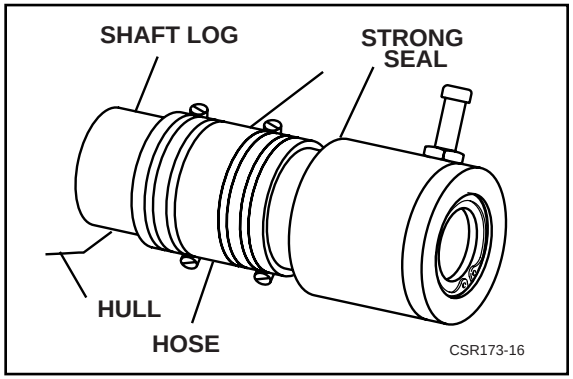
All the operation, specification and maintenance information is contained in the engine owner's manual.

Shaft Assembly

This assembly makes it possible for the shaft to penetrate the hull bottom without allowing water to enter around the joint. The shaft coupling is the connecting point between the engine and the shaft assembly.

SHAFT LOG

The shaft log is laminated to the hull. Rubber hose is clamped to the shaft log and to the shaft seal. The flexibility of the rubber hose allows it to absorb minor engine shock such as moving from forward to reverse, while maintaining a watertight seal on the shaft log and the shaft seal.



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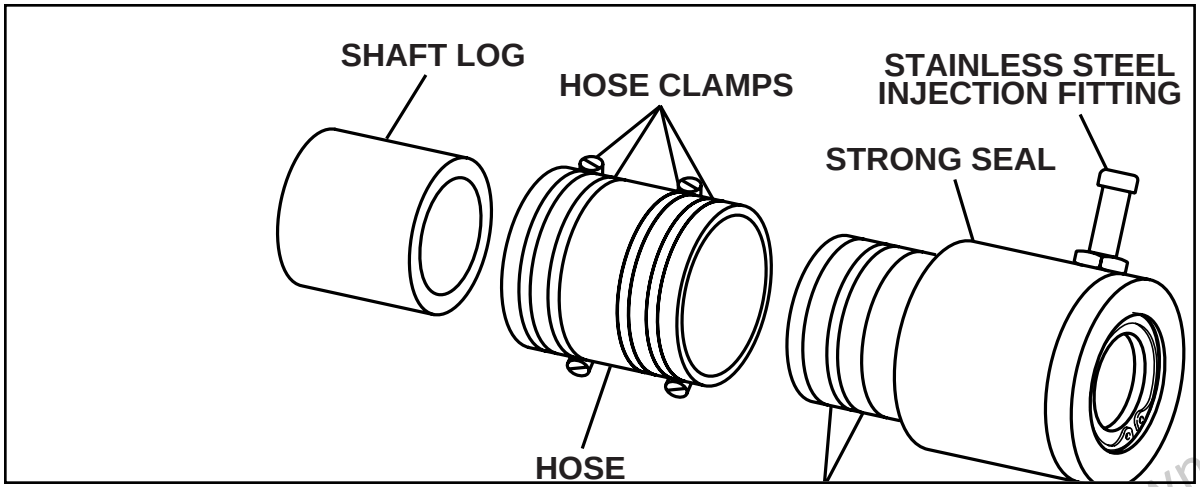
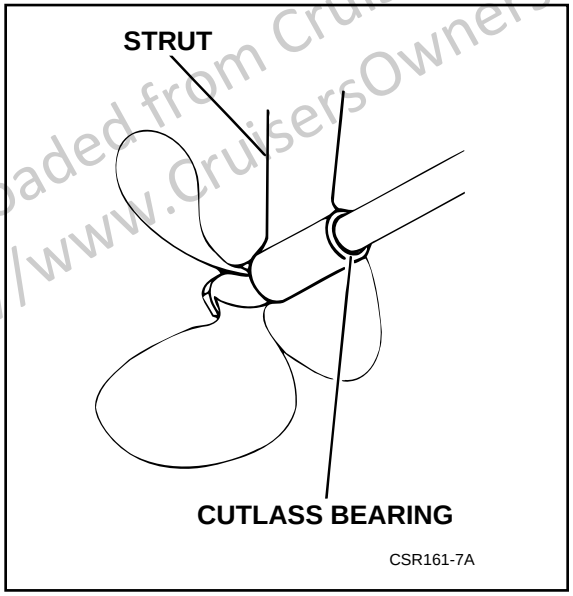


SHAFT SEAL

CAUTION

The shaft seal and rubber tubing should be inspected monthly for wear, leakage and deterioration. Excessive water entry, especially if unattended, could result in the submergence of the engine compartment or of the entire boat.

Strut and Cutlass Bearing



CAUTION

The cutlass bearing is water lubricated. Running the propeller out of the water could result in bearing failure and damage to the shaft.

The propeller shaft is supported on the outside of the hull by a strut. The strut is equipped with a water lubricated plastic bearing that permits free rotation of the propeller shaft.

Propellers

The propellers installed on your boat were selected because their diameter and pitch provide the optimum speed and performance under average conditions of load. Propeller selection must be based upon the ability of the engine to turn the propeller and achieve the manufacturer's recommended RPM at full throttle.

NOTE

Variations from average loadings, bottom condition and/or engine condition could call for a propeller change to achieve the performance desired.

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SELECTING A PROPELLER

CAUTION

Improper propeller selection and installation could result in loss of the propeller and/or excessive stresses on the power train leading to power train failure. Cruisers Yachts recommends that you consult with and employ the skills of your dealer when contemplating a change.

First, ensure that the diameter and pitch provides the performance desired. The engine RPM at full throttle should be in the upper half of the recommended full throttle operating range. If RPMs are low, a propeller with a smaller pitch will increase RPMs. If RPMs are high, a propeller with an increased pitch will lower RPMs.

Second, ensure that the propeller rotation is consistent with engine and gear box rotation. Your boat is designed with counterrotating inboards for minimum torque effects.

Third, ensure that the installation provides adequate safety features such as a straight key, a propeller nut, a jam nut and a cotter pin. Refer to Section 8 for installation instructions.

FUEL SYSTEM (Crossover Valve)

Your boat is equipped with an internal fuel system meeting current federal requirements. The best materials and components available are used to assemble the fuel system.

Model 455 boats have two aluminum, 250 gallon tanks located in the engine compartment. The tank outlets to the engines have a manual valve for fuel shut-off in the event of a line break. To access the manual valves or tank fittings open the fuel access hatch. The valves are on the top of the fuel tank. These valves are attached to the fuel tank outlet and return lines. The valves are closed when the handle is perpendicular to the fuel line and open when the handle is inline with the fuel line.

There are also crossover valves between the tanks located at the top of the fuel tanks under the fuel access hatch.

Fuel fill caps are located on the deck walkaround of the boat. Near the fill cap is a vent which allows air to move in and out of the tank as the fuel level changes. The fill for the starboard tank is on the starboard walkaround and the port fill is on the port walkaround.

The manual valves can control the fuel supply to the engines in five ways:

1. Both handles pointing aft shuts the flow of fuel OFF.
2. When both handles point forward each engine can receive fuel from its respective tank; the port engine receives fuel from the port fuel tank and the starboard engine receives fuel from the starboard tank.
3. When both handles point outboard, both engines receive fuel from both tanks.
4. With the port handle pointing aft and the starboard handle pointing outboard, both engines receive fuel from the starboard tank.
5. With the port handle pointing outboard and the starboard handle pointing aft, both engines receive fuel from the port tank.

WARNING

Leaking fuel and fumes are a fire and explosion hazard. Inspect the entire fuel system regularly.

All fuel system components must be checked before each boating season and regularly during the season for any leaks or bad hose conditions. Make sure the fuel system is leak-free.

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STEERING SYSTEM

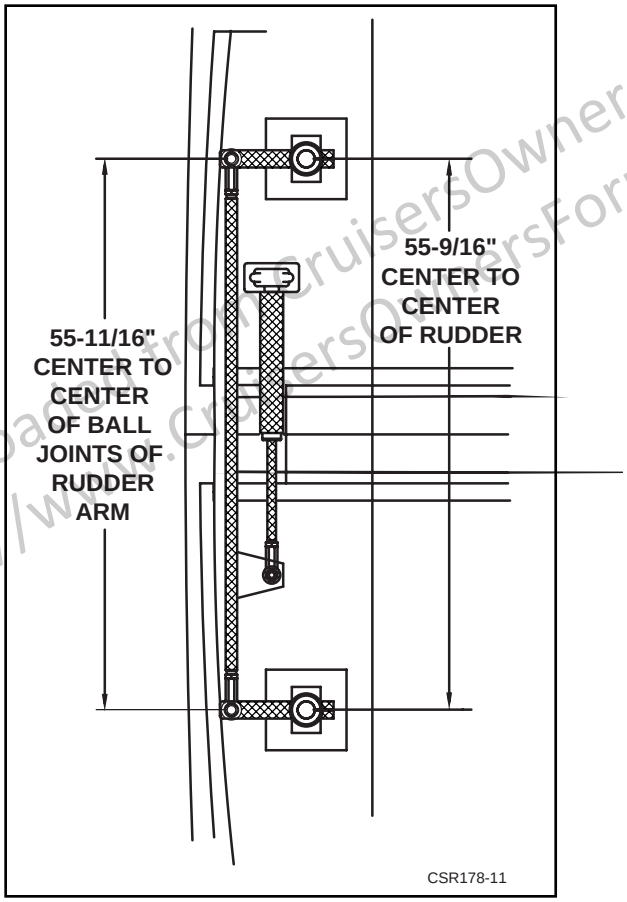
Your boat is equipped with hydraulic steering. The rotation of the steering wheel results in an unbalanced hydraulic (oil) pressure in the two lines going from the helm to the rudder cylinder. The pressure differential is converted to linear motion by the hydraulic steering cylinder which is mechanically linked to the rudder tiller arms. Both rudder tiller arms are rigidly connected together by a tie bar so that both rudders respond equally to the helm.

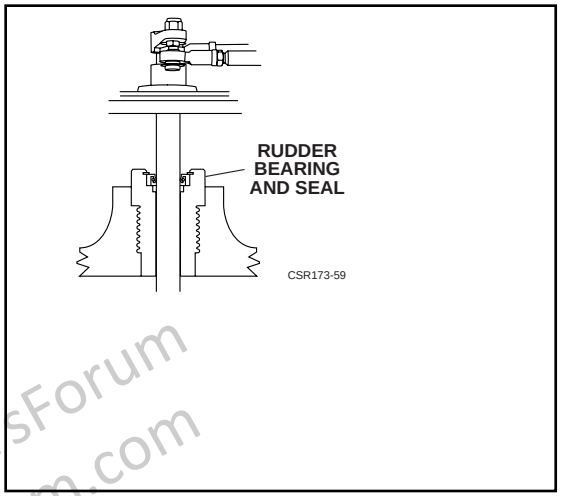
Steering Wheel

The steering wheel uses the assistance of power steering to permit turning of the steering wheel with a minimum of effort. It is important that you know how your boat operates and are aware of its limitations. Follow the operating techniques in Section 5.

Rudder

The twin rudders are offset from the shaft centerline to allow shaft removal without having to remove the rudders. Each rudder is also canted inboard slightly to allow for a constant pressure of water to act upon the rudder face. The pressure on the rudder face prevents “flutter” in a 0° rudder position.





CAUTION

The carrier seal should be inspected regularly for excessive water entry. If left unattended, excessive water entry could result in the submergence of the engine compartment, or of the entire boat. Cruisers Yachts will not warrant damage incurred due to an improperly adjusted packing nut.

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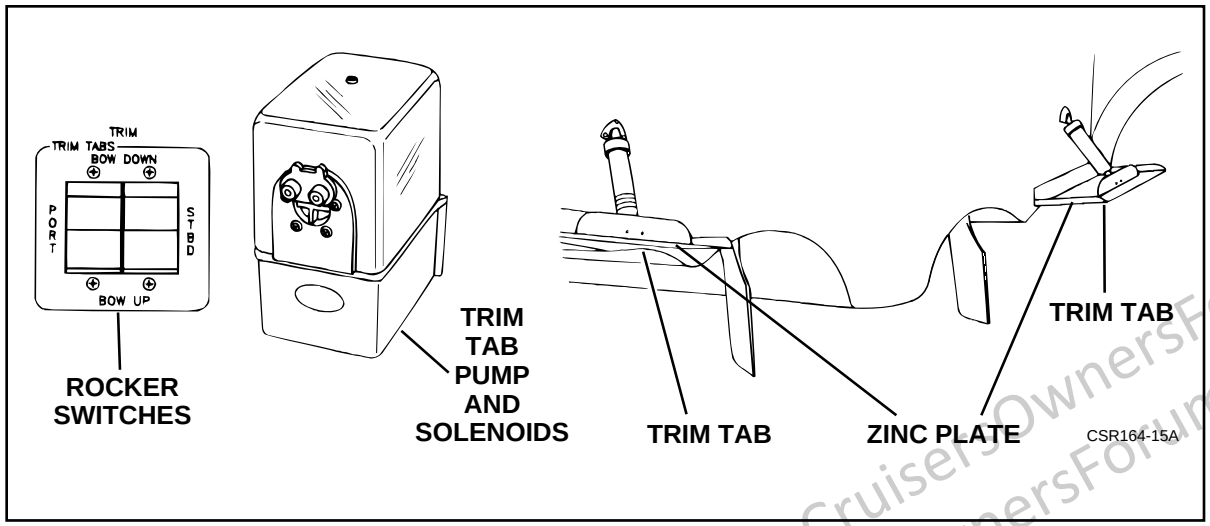

TRIM TABS

The trim tab system is an electro-hydraulic system. Two rocker switches, marked port and starboard, control a hydraulic pump and solenoids. The pump sends hydraulic oil to hydraulic actuators (cylinders) which lower the trim tabs. To raise the trim tabs, the rocker switch is moved which allows oil to flow from the actuator to the pump.

ELECTRICAL SYSTEM

Your boat is equipped with two electrical systems; a battery powered direct current (DC) system and a generator or shore powered alternating current (AC) system. Both systems are controlled from the AC/DC master panel.

The DC system supplies power to all of the boat's 12V electrical circuits (lights, pumps, blowers, ignition, etc.).

The AC system supplies power to the 120/240 volt systems when the boat is moored at the dock or slip, or when the generator is running.

DC Electrical System

WARNING

Considerable care has been taken to design a safe electrical system to protect you from hazardous shocks. Any modifications to the system should always be done by an authorized Cruisers Yachts dealer not only to protect your warranty but to protect you from hazardous shock.

Your boat has a 12 volt DC house system. The positive wire is hot and feeds current from the batteries to the various 12 volt systems and the negative wire is the ground.

Several engine options are equipped with up to six batteries. There is a cranking battery for each engine, two batteries in parallel for 12 volt house power, a generator battery and an optional bow thruster battery.

When the engines are running all batteries are charged by the alternators. There is a battery charger for the house and cranking batteries and an optional battery charger for the optional bow thruster battery. The battery chargers are powered by either the dockside or generator 120VAC power. The generator battery is charged by the generator.

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A bonding wire is extended through a #6 green wire from the bonding strip to a terminal behind the instrument panel. This will facilitate electronics installation. In addition, the handrails are attached to the bonding system.

The house batteries are isolated from the cranking batteries by a battery isolator. When the engines and ignition switches are "OFF" the isolator prevents house battery loads from discharging the cranking batteries. When the batteries are being charged by the alternators, the isolator automatically isolates the batteries and will distribute the charge among the batteries according to individual need.

DC MASTER PANEL

The DC master panel consists of a voltmeter, ammeter, a battery test switch, a series of switch type and resettable circuit breakers, a generator start switch and the DC main circuit breaker.

The meter is a convenience feature which allows you to check on the condition of the three batteries. With master breaker switch in "OFF" position, turn battery test switch to:

- "Stbd" to check the starboard engine cranking battery.
- "Port" to check the port engine cranking battery.
- "Generator" to check the generator cranking battery.
- "House" to check the house batteries.
- "OFF" to disable meter and test circuit.

CAUTION

Never reset a breaker which has been automatically tripped without first discovering and remedying the cause of the problem.

The switch type circuit breakers' function allows you to manually enable or interrupt a circuit by moving the switch on or off. The breakers protect the system receiving the DC power by automatically opening the circuit should a short or overload condition occur.

The resettable circuit breakers protect the system receiving the DC power by automatically opening the circuit should a short or overload occur.

OPERATION OF DC SYSTEMS

Read through the table on the following pages to familiarize yourself with the DC systems on your boat.

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DC PANEL CIRCUIT BREAKER FUNCTIONS

DC Circuit Breaker	Function
DC MAIN	Put the breaker in the “ON” position to connect power to rest of the circuit breakers on the panel except the bilge pumps and the C.O. detectors. The Automatic bilge pump circuit breakers are mounted on the AUTOMATIC BILGE PUMP C.B. PANEL located in the engine room. If any of the breakers are tripped, the white button popped out, reset them immediately. The STEREO MEM, SHOWER SUMPS and C.O. DETECTORS circuit breakers are connected directly to the 12V battery power. The C.O. DETECTORS and SHOWER SUMPS circuit breakers should be reset immediately if they are tripped, popped out.
LIGHTS FSR	Put the circuit breaker in the “ON” position to connect power to the forward state room light switches.
LIGHTS MSR	Put the circuit breaker in the “ON” position to connect power to the master state room light switches.
LIGHTS COCKPIT	Put the breaker in the “ON” position to connect power to the cockpit light switches.
LIGHTS AFT HEAD	Put the breaker in the “ON” position to connect power to the lights in the aft head.
LIGHTS FWD HEAD	Put the breaker in the “ON” position to connect power to the forward head light switch.
PUMP FWD HEAD, PUMP AFT HEAD	Put the breakers in the “ON” position to connect power to the head pumps. Power to the pumps must be “ON” or the electrically controlled heads will not flush.
SHORE POWER RETRACT (OPTIONAL)	Put the breaker in the “ON” position to connect power to the dockside retract motor. The motor can be controlled to extend or retract the dockside cable by either the shore power cord retractor switch located just inboard of the shore power cord receptacle (aft starboard corner of the deck) or a remote control. The remote control is included in the Captain’s bag.
FRESH WATER PUMP	Put the breaker in the “ON” position to turn on the fresh water pump and the fresh water tank gauge. The pump will turn on automatically when a fresh water demand is actuated, i.e. opening a faucet, and will run at the speed required to maintain water flow.
CPT WASH DOWN	Put the breaker in the “ON” position to turn on the cockpit wash down pump.
FWD MACERATOR	Put the breaker in the “ON” position to turn on the forward macerator.
SPARE/AFT MACERATOR	Put the breaker in the “ON” position to turn on the aft macerator.
LIGHTS MID CABIN	Put the breaker in the “ON” position to connect power to the mid cabin light switches.
LIGHTS GALLEY	Put the breaker in the “ON” position to connect power to the galley light switches.
REFRIGERATOR	Put the breaker in the “ON” position to connect power to the refrigerator.

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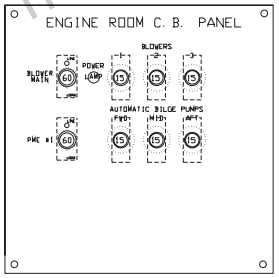
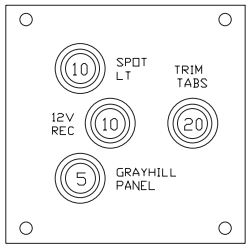
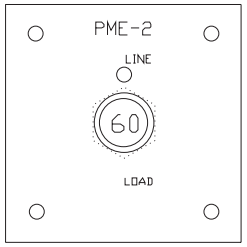
DC Circuit Breaker	Function
SPARE	This breaker is a spare for future use.
STEREO/TV AMP	Put the breaker in the “ON” position to connect power to the stereo and the TV antenna amplifier.
PME’S/STEREO MEM/ SHOWER SUMPS/ C.O. DETECTORS	These circuit breakers are not switchable. If an overload trips the breaker, determine the cause of the overload, clear the fault and push the breaker reset button to reset it.
PME’S	This circuit breaker connects power to solenoids PME-1 and PME-2 which feed power to the two control circuit PMEs (Power Management Enclosures) in the Grayhill control system. PME-1 and PME-2 have outputs that are controlled by the keypad mounted at the helm.
STEREO MEM	This breaker connects power to the stereo memory.
SHOWER SUMPS	This breaker connects power to the shower sump pumps for automatic pump operation. The shower sump pumps are turned on by float switches when the water level causes the float switches to rise. In addition to the showers, air conditioners and sinks drain into the sumps, requiring continuous automatic operation.
C.O. DETECTORS	This breaker connects power to the C.O. detectors. The breaker is connected to +12 volts directly, bypassing the DC MAIN circuit breaker for continuous C.O. detection. Reset this breaker immediately if it is tripped.
BLOWERS ON	This switch controls the engine room blowers. Switch the blowers on for at least 4 minutes prior to starting the engines or generator to rid the engine room of fumes.
GENERATOR	Push the **START** switch until you hear that the generator has started, then release the switch. To stop push the **STOP** switch and hold it in until the generator stops.
AUXILIARY ENGINE CONTROL	These switches are utilized to start and stop the engines in the event that the keypad is not used for these funtions. In normal operation the keys should be removed and the engine start/stop functions controlled from the keypad.
ADDITIONAL CIRCUIT BREAKER PANELS	There are three additional circuit breaker panels located in the boat for localized functions. The panel locations and functions are shown on the 455 CIRCUIT BREAKER PANELS drawing.



LOCATED ON THE FORWARD BULKHEAD IN THE ENGINE ROOM



PANEL LOCATED BELOW THE DASH



LOCATED ADJACENT TO AC/DC PANEL

35-E001B-Manual

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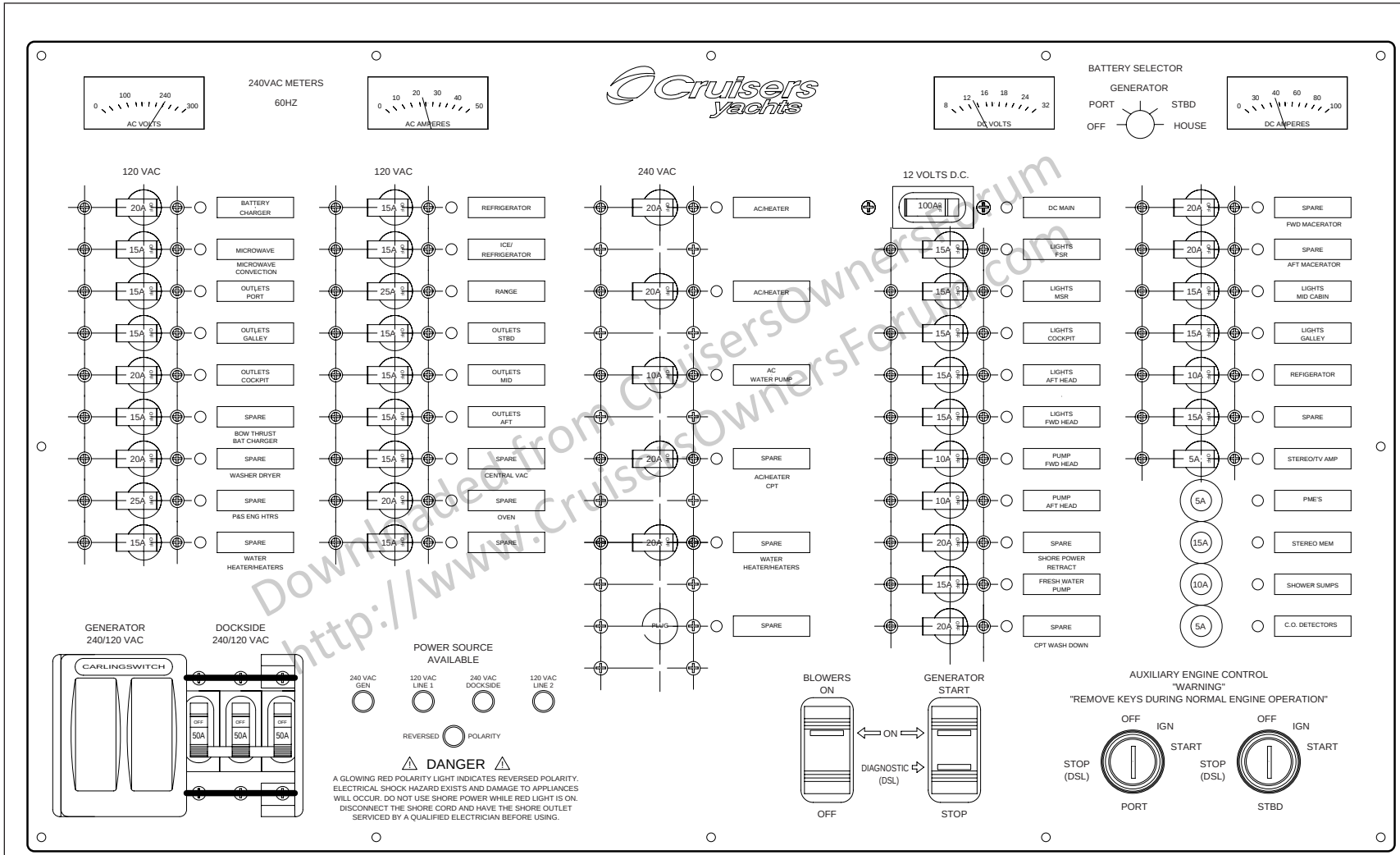
US STDS



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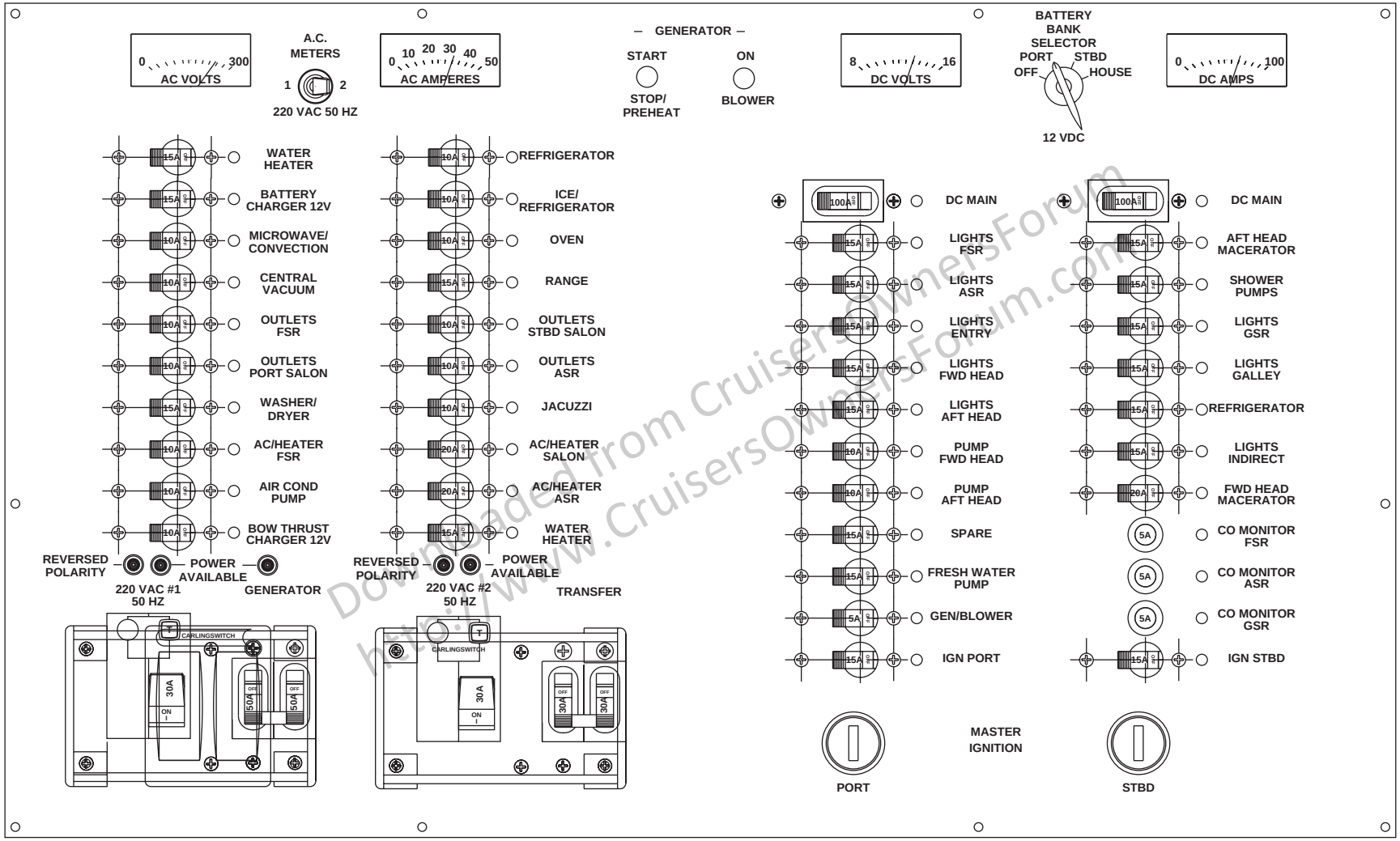
INTL STDS 2-30 AMP (220 VOLTS)



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CSR178-13

AC Electrical System

WARNING

Considerable care has been taken to design a safe electrical system to protect you from hazardous shocks. Any modifications to the system should always be done by an authorized Cruisers Yachts dealer not only to protect your warranty, but to protect you from hazardous shock.

AC POWER

The standard AC electrical system in the 455 is wired for 120/240 volts AC, 50 amps, single phase, 60 hertz power. The neutral (white) conductor is connected to shore grounded neutral. The boat ground (green wire) is connected to the dockside ground via a galvanic isolator. The galvanic isolator reduces galvanic corrosion due to stray low voltage DC currents between the boat ground and the dockside earth ground.

An optional AC system for non US power is wired for 220 volt, 32 amp, 50 hertz power.

AC MASTER PANEL

United States Version

120/240 VAC, 50 amp, 60 hertz single phase is the standard power system. An onboard generator will furnish 120/240 VAC single phase power.

International Version

220 VAC, 32 amp, 50 hertz single phase is the optional international power system. An onboard generator will furnish 220 VAC 50 hertz power.

The load center can receive power from dockside or the generator. For dockside power, move the slide protector over the generator breaker and turn on the dockside breaker. For generator power, move the slide protector over the dockside breaker and turn on the generator breaker.

CAUTION

Never reset a breaker which has been automatically tripped without first discovering and remedying the cause of the problem.

The circuit breakers' function is twofold; they allow you to manually enable or interrupt a circuit by flipping the switch ON or OFF and they also protect the system receiving the AC load by automatically breaking the circuit in cases of shorts or overloads.

IMPORTANT

Read the generator owner's manual contained in the Skipper's Kit before operating the generator for the first time. The manual contains important operation and maintenance information.

The generator is started from it's own battery.

To start the generator, hold generator switch in the START position until you hear that the generator has started, then release switch. The switch will automatically return to the RUN position and AC power is applied to the load center or centers selected.

Turn generator off by placing the generator switch in the STOP position.

The power transfer slide protector prevents accidental use of shore power and generator power at the same time. Slide protector positioning is discussed under Operation of AC Systems.

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OPERATION OF AC SYSTEMS

Connecting Shore Power Cable:

1. Make sure the shore dockside breaker, located in the Aft Stateroom (aft starboard corner storage cabinet, aft of the make-up cabinet) and the boat main dockside breaker and the boat AC/DC panel DOCKSIDE breakers located on the lower left portion of the AC/DC panel.
2. Connect the shore power cable to the boat receptacle and then connect the shore power cable to the dockside power source.
3. Switch the shore dockside breaker “ON.” Switch the boat dockside power breaker “ON.” Then check the AC/DC panel POWER SOURCE AVAILABLE indicator lights. 120 VAC LINE 1, VAC DOCKSIDE and 120 VAC LINE 2 indicator lights should be “ON.” The REVERSED POLARITY light should be off.

⚠ CAUTION

Do not turn the DOCKSIDE 240/120 VAC breaker on if the REVERSED POLARITY light is “ON.” Severe damage to the electrical system could result. Disconnect the cable and have the fault corrected by a qualified electrician.

4. Be sure the DC MAIN circuit breaker is “OFF” and any 120 VAC or 240 VAC that should not receive power immediately are switched “OFF.” If the indicator lights are normal, then the DOCKSIDE 240/120 VAC circuit breaker may be switched on. AC and DC circuit breakers may then be switched “ON” as needed.

Disconnecting Shore Dockside Power:

1. Switch the boat DOCKSIDE 240/120 VAC circuit breaker “OFF.”
2. Switch the boat dockside power circuit breaker “OFF.”
3. Switch the shore dockside power circuit breaker “OFF.”
4. Disconnect the dockside power cable.

Galvanic Isolators

The Galvanic Isolator(s) installed in Cruisers Yachts comply with the ABYC A-28 standard. Section A-28.13 requires status monitoring of the galvanic isolator. The conditions monitored are:

A-28.13.1.1 shorted or open condition of any diode;
A-28.13.1.2 failure to block galvanic current at 1.1 volts DC;
A-28.13.1.3 circuit continuity of the shore grounding circuit;
A-28.13.1.4 operation of the status monitoring device.

Yachts with single docksides have one galvanic isolator. Yachts with dual docksides have two galvanic isolators. The galvanic isolators have status indicating LEDs (light emitting diodes) which indicate the conditions required in A-28.13.

Further, ABYC A-28.13.2 requires the status-indicating device for the galvanic isolator shall be mounted in a location readily apparent to the vessel operator. Because the galvanic isolators are not located where these diodes are readily apparent, a status indicating panel has been installed in the AC/DC panel area to duplicate the indications of the LEDs on the galvanic isolator(s), L1 and L2 for dual docksides. The galvanic isolator is located behind the AC/DC panel. Each galvanic isolator dockside circuit has a red and a green status indicating diode. The following LED FUNCTION CHART describes the monitoring functions.

GREEN **When the dockside power is connected and the green LED is on continuously, the galvanic isolator is functioning normally and the dockside connection is correct. When the dockside power is disconnected, it will take a minute or more for the red LED to start blinking.**

RED **If the red LED is on continuously, it indicates a faulty condition internal to the galvanic isolator. The galvanic isolator must be replaced.**

RED **If the red LED is blinking on and off, either:**

1. **The dockside power is disconnected, or;**
2. **There is a large amount of current in the grounding system. Refer this issue to a qualified electrician.**

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AC PANEL CIRCUIT BREAKERS

When the AC panel is receiving power the following circuit breakers can be switched "ON." Refer to the INTERIOR OUTLET PLAN LAYOUT and the DECK OUTLET LAYOUT drawings for location details.

120 VAC CIRCUIT BREAKER FUNCTIONS	
AC Circuit Breaker	**Function**
BATTERY CHARGER	Switch the breaker "ON" to connect 120 VAC to the battery charger. This 12VDC battery charger charges the engine cranking batteries and the house batteries. These batteries are also charged by the engine alternators when the engines are running.
MICROWAVE	Switch the breaker "ON" to connect power to the microwave oven. The oven is controlled by its front panel controls. Refer to the Skipper's Kit for detailed oven operating instructions.
OUTLETS PORT	Switch the breaker "ON" to connect power to the salon port 120 volt AC outlet and the outlet in the forward stateroom.
OUTLETS GALLEY	Switch the breaker "ON" to connect power to the galley GFCI outlets.
OUTLETS COCKPIT	Switch the breaker "ON" to connect power to the cockpit 120 volt AC GFCI outlet.
SPARE/BOW THRUST BATTERY CHARGER	Switch the breaker "ON" to connect power to the optional bow thruster battery charger.
SPARE/ WASHER DRYER	Switch the breaker "ON" to connect power to the optional washer/dryer. Refer to the Skipper's Kit for washer/dryer operation instructions.
SPARE/P&S ENGINE HEATERS	Switch the breaker "ON" to connect power to the optional engine heaters. IMPORTANT! Refer to the engine heater instructions in the Skipper's Kit for proper operation of the engine heaters. The heaters or engines could be damaged if the heaters are not operated as detailed in the engine heater manual.
SPARE/WATER HEATER/HEATERS	Switch the breaker "ON" to connect power to the optional water heater(s). Refer to water heater instructions in the Skipper's Kit for proper operation.
REFRIGERATOR	Switch the breaker "ON" to connect power to the refrigerator. Refer to the Skipper's Kit for refrigerator operation instructions.

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120 VAC CIRCUIT BREAKER FUNCTIONS (continued)	
AC Switch	**Function**
ICE/REFRIGERATOR	Switch the breaker “ON” to connect power to the cockpit ice maker/refrigerator.
RANGE	Switch the breaker “ON” to connect power to the galley range.
OUTLETS STBD	Switch the breaker “ON” to connect power to the salon starboard dinette 120 volt AC outlets, the forward head GFCI outlet and the forward stateroom starboard outlet.
OUTLETS MID	Switch the breaker “ON” to connect power to the mid cabin 120 volt AC outlets.
OUTLETS AFT	Switch the breaker “ON” to connect power to the port aft stateroom GFCI outlet and the other aft stateroom outlets.
CENTRAL VAC	Switch the breaker “ON” to connect power to the central vacuum cleaner system.
SPARE/OVEN	Switch the breaker “ON” to connect power to the optional convection oven.
SPARE	This spare circuit breaker is available for optional 120 VAC equipment.
240 VAC CIRCUIT BREAKER FUNCTIONS	
AC/HEATER	Switch the breaker “ON” to connect power to the salon air conditioner/heater.
AC/HEATER	Switch the breaker “ON” to connect power to the aft stateroom air conditioner/heater.
AC WATER PUMP	Switch the breaker “ON” to connect power to the air conditioner water pump. The pump must be switched on when either or both air conditioners are on.
SPARE	This spare circuit breaker is available for options.
SPARE/ WATER HEATER/ HEATERS	Switch the breaker “ON” to turn on both water heaters.

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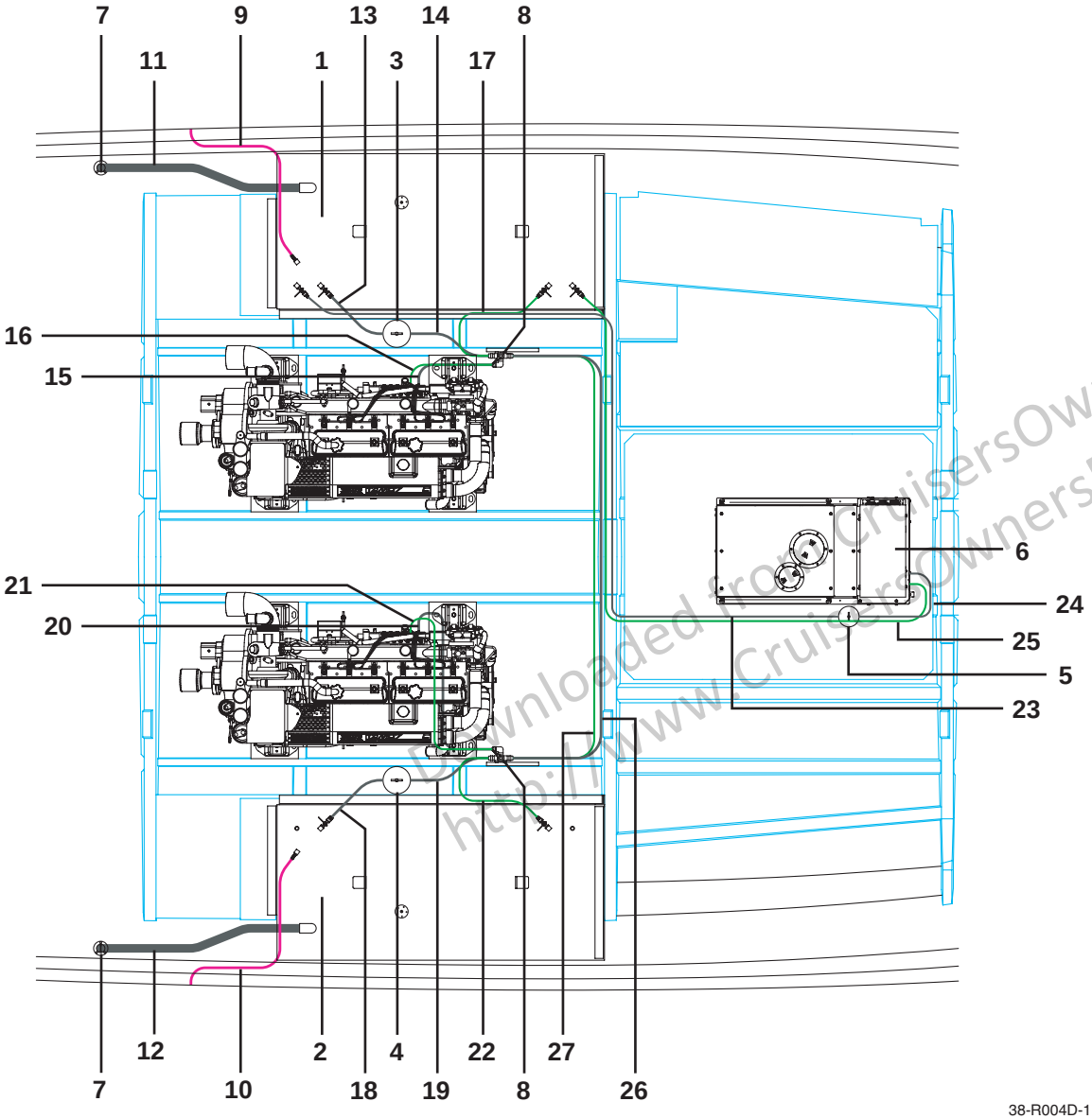
DIESEL LAYOUT



1. Port Fuel Tank (250 Gallon)
2. Starboard Fuel Tank (250 Gallon)
3. Port Engine Fuel Filter
4. Starboard Engine Fuel Filter
5. Genset Fuel Filter
6. Generator Unit
7. Diesel Fuel Deck Plate
8. 6 Port Fuel Crossover
9. Port Tank Vent Hose, 12' (5/8" dia.)
10. Starboard Tank Vent Hose, 12' (5/8" dia.)
11. Fuel Fill Port Tank, 7' (2" dia.)
12. Fuel Fill Starboard Tank, 7' (2" dia.)
13. Port Tank to Filter, 32" (5/8" dia.)
14. Port Filter to X-Over, 28" (5/8" dia.)
15. Port X-Over to Engine, 5'8" (5/8" dia.)
16. Port Engine Return to X-Over, 5'4" (3/8" dia.)
17. Port X-Over Return to Tank, 3'3" (3/8" dia.)
18. Starboard Tank to Filter, 32" (5/8" dia.)
19. Starboard Filter to X-Over, 32" (5/8" dia.)
20. Starboard X-Over to Engine, 9'4" (5/8"dia.)
21. Starboard Engine Return to X-Over, 12'6" (3/8" dia.)
22. Starboard X-Over Return to Tank, 3'3" (3/8" dia.)
23. Tank to Genset Filter, 15'6" (3/8" dia.)
24. Filter to Genset, 4'4" (3/8" dia.)
25. Genset Return, 14'6" (3/8" dia.)
26. Port X-Over to Starboard X-Over, 11' (5/8" dia.)
27. Port X-Over To Starboard X-Over, 11'4" (3/8" dia.)

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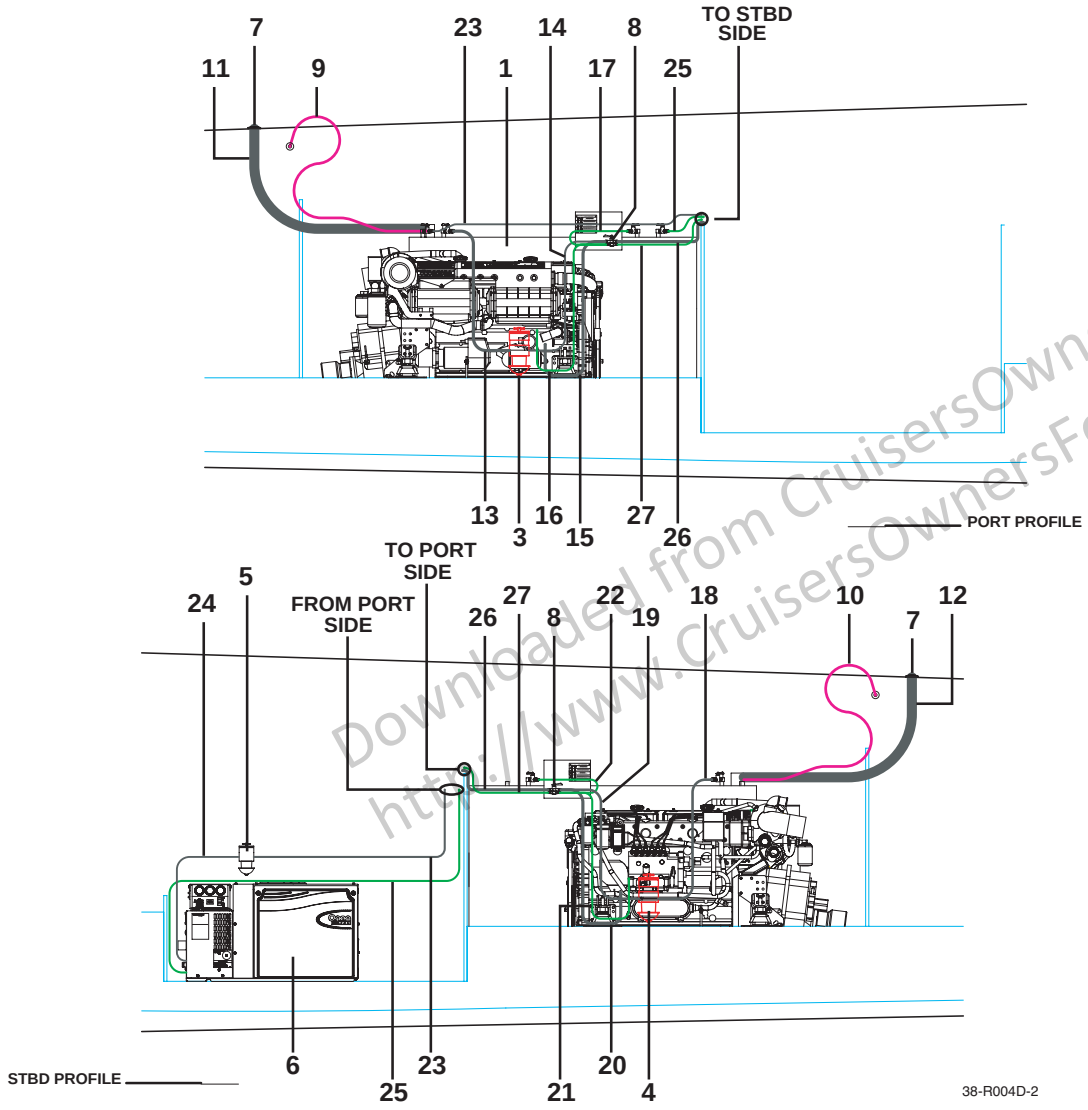
DIESEL LAYOUT (CONT.)



1. Port Fuel Tank (250 Gallon)
2. Starboard Fuel Tank (250 Gallon)
3. Port Engine Fuel Filter
4. Starboard Engine Fuel Filter
5. Genset Fuel Filter
6. Generator Unit
7. Diesel Fuel Deck Plate
8. 6 Port Fuel Crossover
9. Port Tank Vent Hose, 12' (5/8" dia.)
10. Stbd Tank Vent Hose, 12' (5/8" dia.)
11. Fuel Fill Port Tank, 7' (2" dia.)
12. Fuel Fill Starboard Tank, 7' (2" dia.)
13. Port Tank to Filter, 32" (5/8" dia.)
14. Port Filter to X-Over, 28" (5/8" dia.)
15. Port X-Over to Engine, 5'8" (5/8" dia.)
16. Port Engine Return to X-Over, 5'4" (3/8" dia.)
17. Port X-Over Return to Tank, 3'3" (3/8" dia.)
18. Starboard Tank to Filter, 32" (5/8" dia.)
19. Starboard Filter to X-Over, 32" (5/8" dia.)
20. Starboard X-Over to Engine, 9'4" (5/8" dia.)
21. Starboard Engine Return to X-Over, 12'6" (3/8" dia.)
22. Starboard X-Over Return to Tank, 3'3" (3/8" dia.)
23. Tank to Genset Filter, 15'6" (3/8" dia.)
24. Filter to Genset, 4'4" (3/8" dia.)
25. Genset Return, 14'6" (3/8" dia.)
26. Port X-Over to Starboard X-Over, 11' (5/8" dia.)
27. Port X-Over to Starboard X-Over, 11'4" (3/8" dia.)

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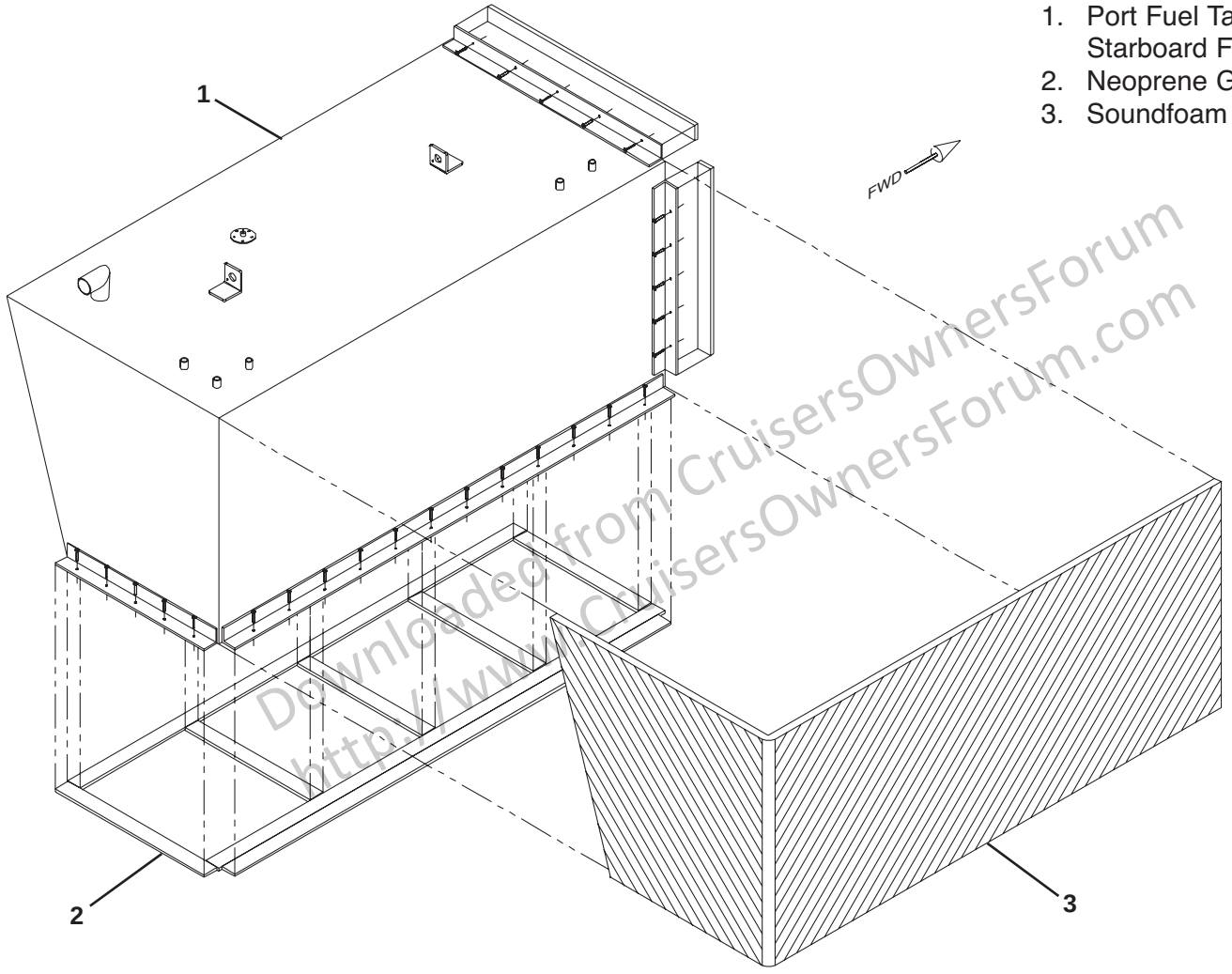
FUEL TANK INSTALLATION



1. Port Fuel Tank (250 Gallon)
   Starboard Fuel Tank (250 Gallon)
2. Neoprene Gasket
3. Soundfoam (1”)

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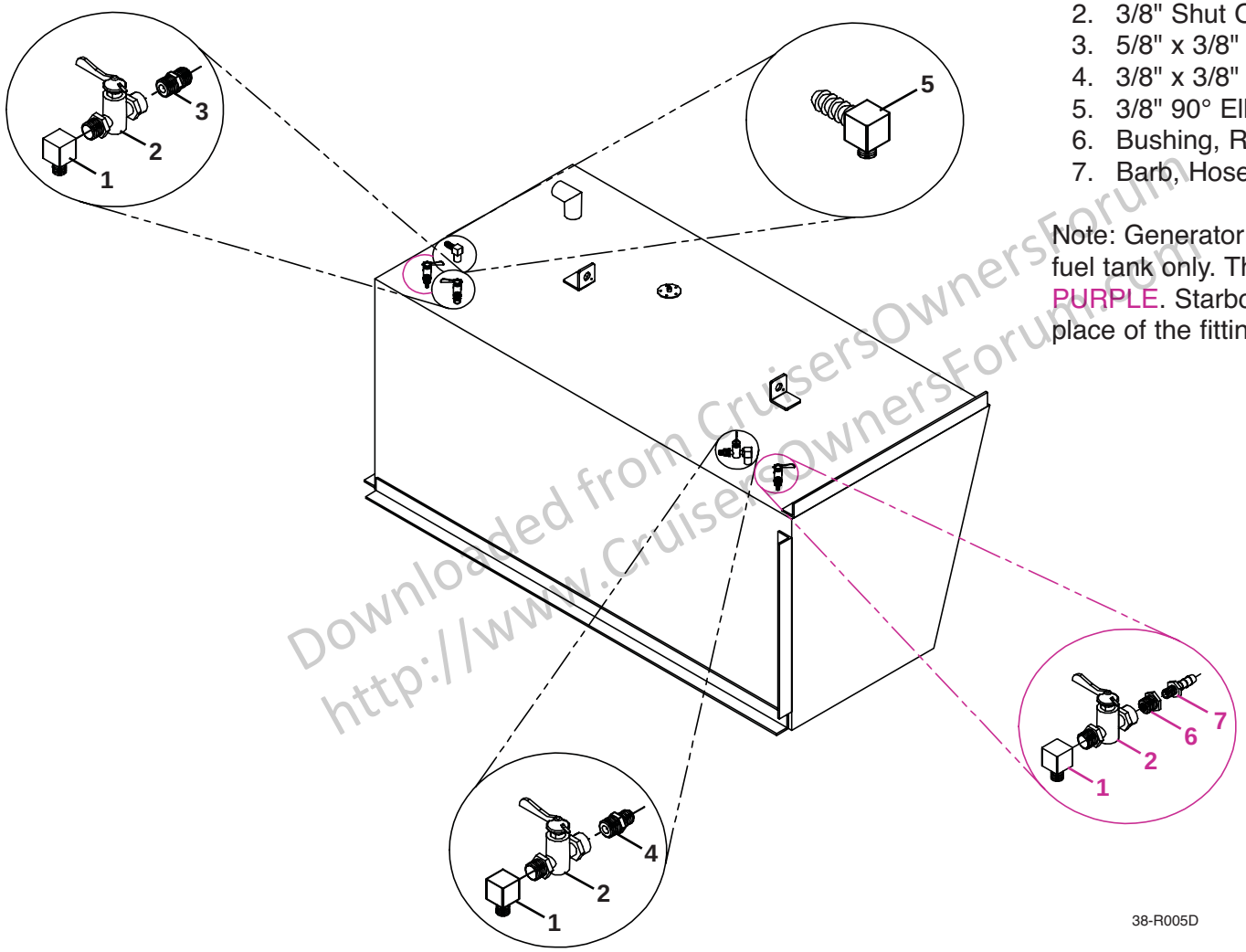
DIESEL FUEL TANK FITTINGS



1. 3/8" x 3/8" Elbow
2. 3/8" Shut Off Valve
3. 5/8" x 3/8" Adapter
4. 3/8" x 3/8" Adapter
5. 3/8" 90° Elbow W/Barb
6. Bushing, Reducer, 5/8" MPT x 3/8" FMT
7. Barb, Hose, 3/8" MPT x 3/8" NPT

Note: Generator fuel fittings on the port fuel tank only. The fittings are circled in PURPLE. Starboard tank uses 3/8" plugs in place of the fittings.

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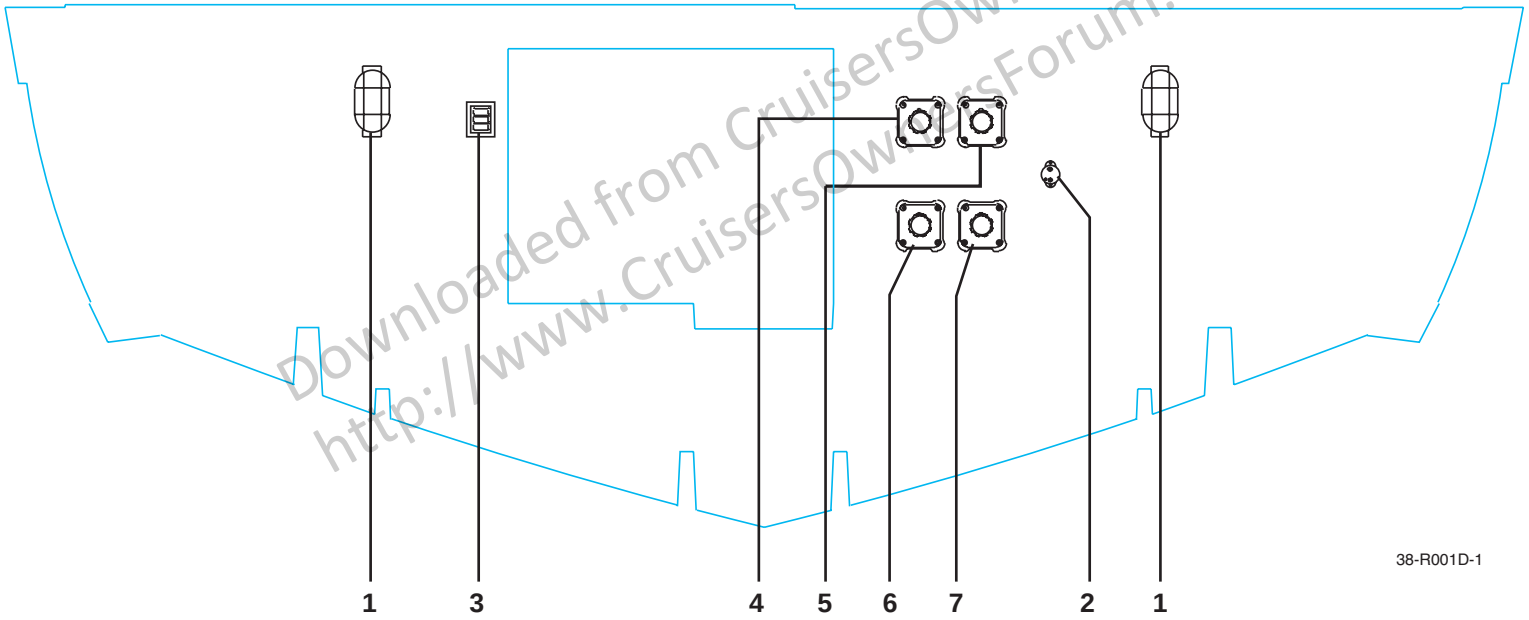
FORWARD ENGINE ROOM BULKHEAD

1. Engine Room Light
2. Battery Parallel Solenoid
3. 3 Mod Switch Box
   Blank Switch
   1 Way Switch
4. Genset Battery Switch
5. Starboard Engine Battery Switch
6. Accessory Battery Switch
7. Port Engine Battery Switch



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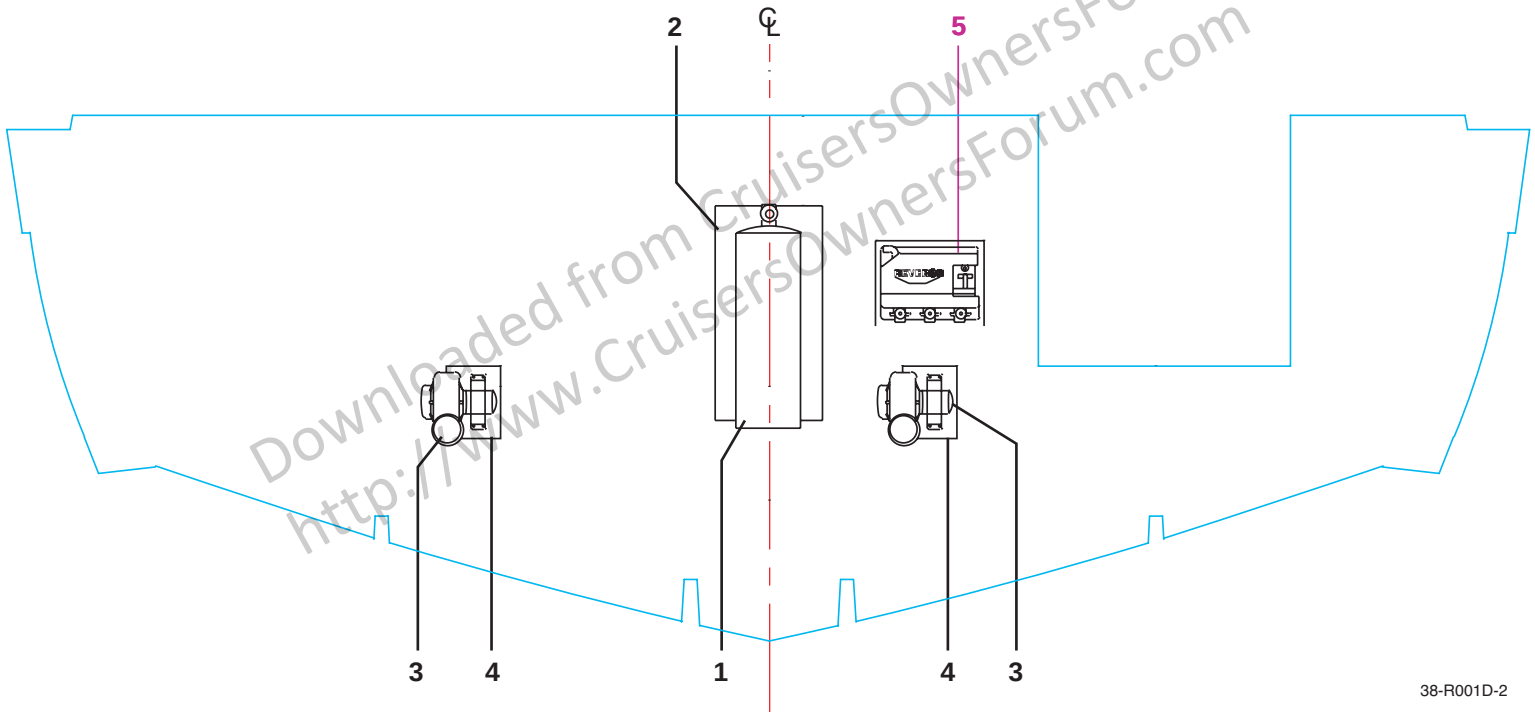
AFT ENGINE ROOM BULKHEAD (VOLVO TAMD75P)

1. Fire Extinguisher (U.S.)
   Fire Extinguisher (C.E.)
2. Fire Extinguisher Board (12" x 24")
3. 4" Engine Room Blower (U.S.)
   4" Engine Room Blower (C.E.)
4. Blower Board (6" x 8")
5. Reverso Oil Exchange Unit

NOTE: Purple = optional equipment



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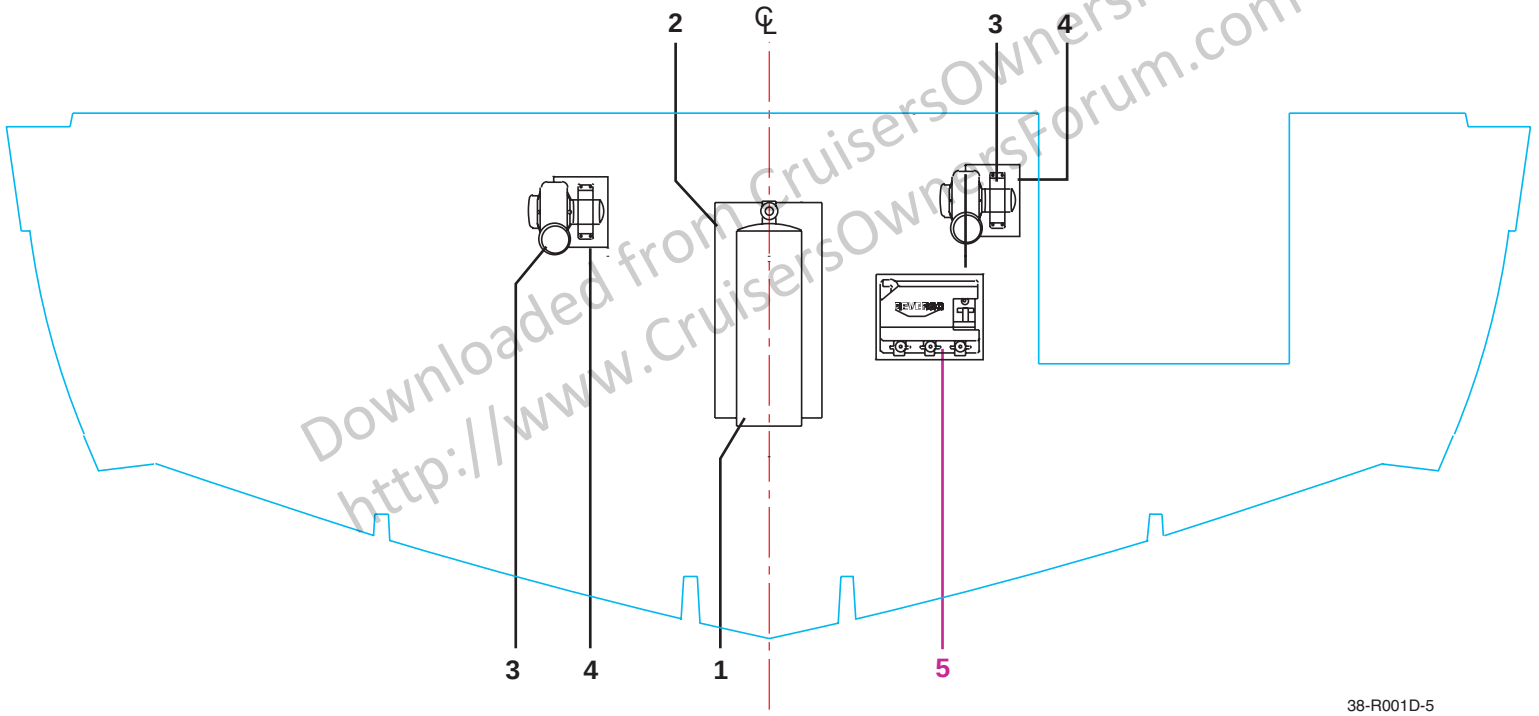
AFT ENGINE ROOM BULKHEAD (YANMAR 6CX-GTE)

1. Fire Extinguisher (U.S.)
   Fire Extinguisher (C.E.)
2. Fire Extinguisher Board (12" x 24")
3. 4" Engine Room Blower (U.S.)
   4" Engine Room Blower (C.E.)
4. Blower Board (6" x 8")
5. Reverso Oil Exchange Unit

NOTE: Purple = optional equipment



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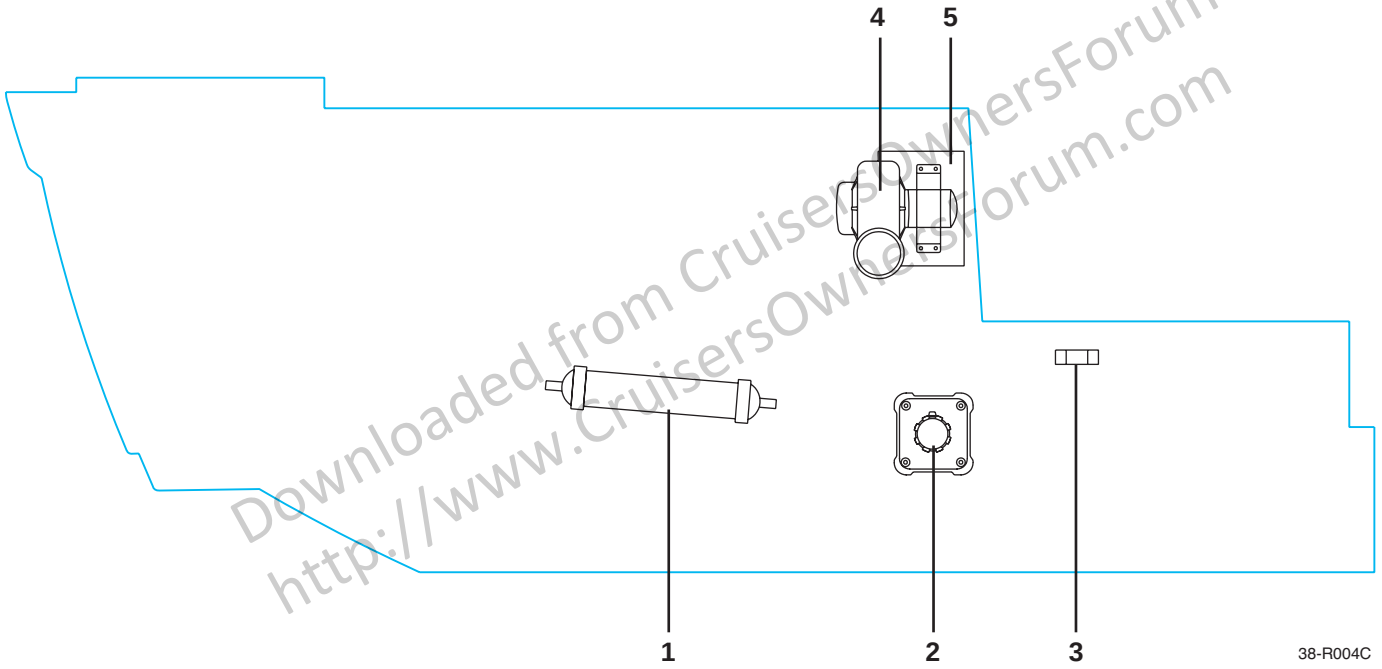
FORWARD GENERATOR ROOM BULKHEAD

1. Forward Waste Tank Vent Filter
2. Bow Thruster Battery Switch
3. Bow Thruster Fuse
4. 4" Generator Room Blower (U.S.)
   4" Generator Room Blower (C.E.)
5. Blower Board (6" x 8")



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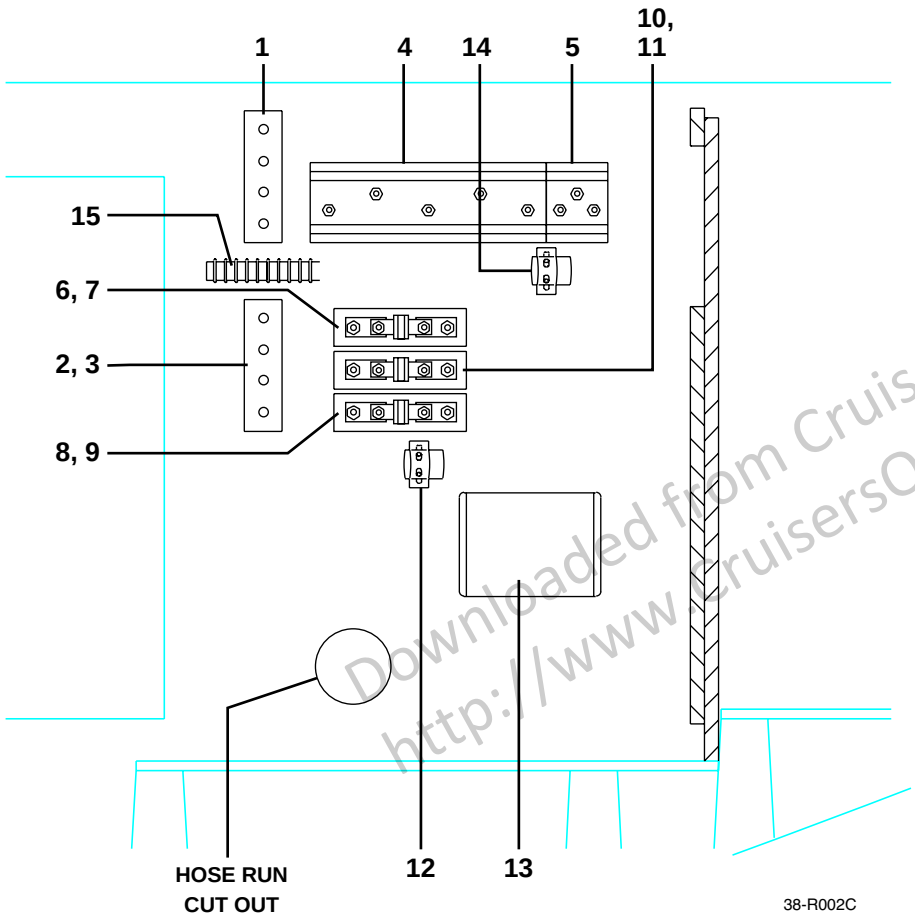
AFT GENERATOR ROOM BULKHEAD



1. Negative Terminal Bar
2. Positive Terminal Bar
3. Terminal Bar Cover
4. Battery Isolater, 120 Amp
5. Bow Thruster Battery Isolator
6. DC Main Fuse Block, 200 Amp
7. DC Main Fuse, 150 Amp
8. Windlass Fuse Block, 200 Amp
9. Windlass Fuse, 150 Amp
10. Helm Area Fuse Block, 200 Amp
11. Helm Area Fuse, 150 Amp
12. Helm Area Solenoid
13. A/C Pump Control Box
14. Blower Solenoid
15. 24 Tab Ground Buss Panel

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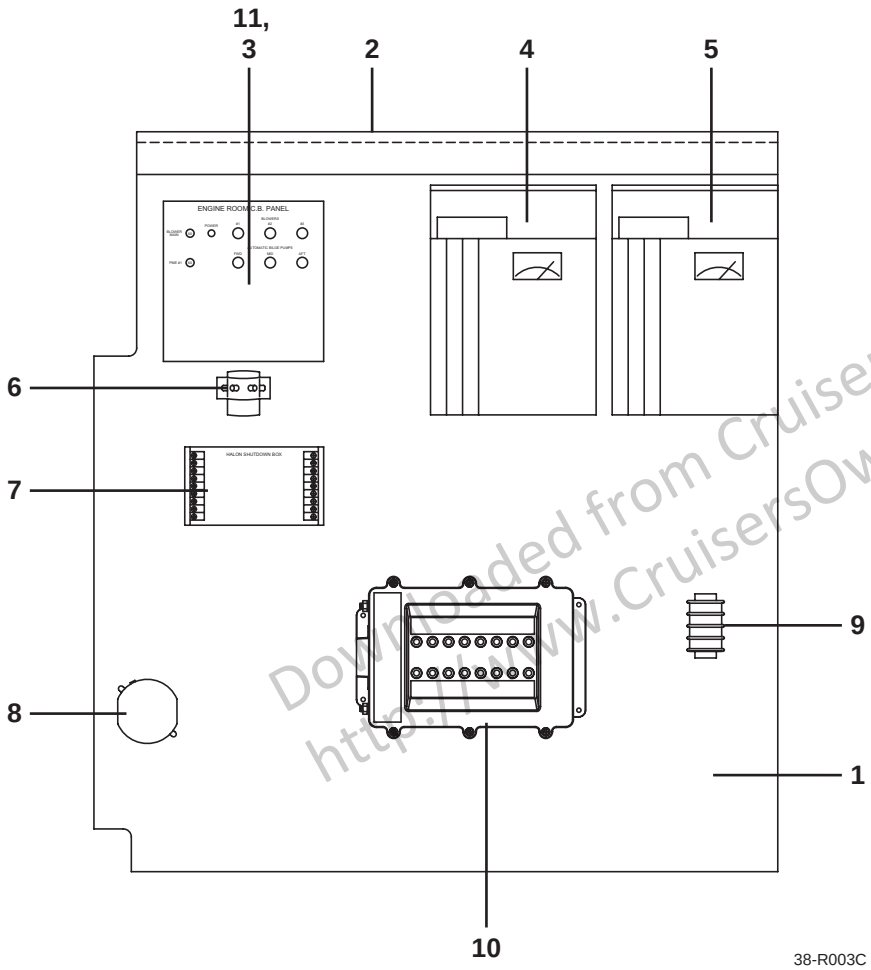
BATTERY CHARGER BOARD



1. Battery Charger Board
2. 2" x 3/4" Mounting Cleat
3. Blower Breaker Panel
4. Battery Charger
5. Battery Charger
6. Solenoid
7. Fireboy Shutdown System
8. Round Junction Box
9. Strip Barrier 50 Amp
10. PME Box #1
11. Battery Box Switch

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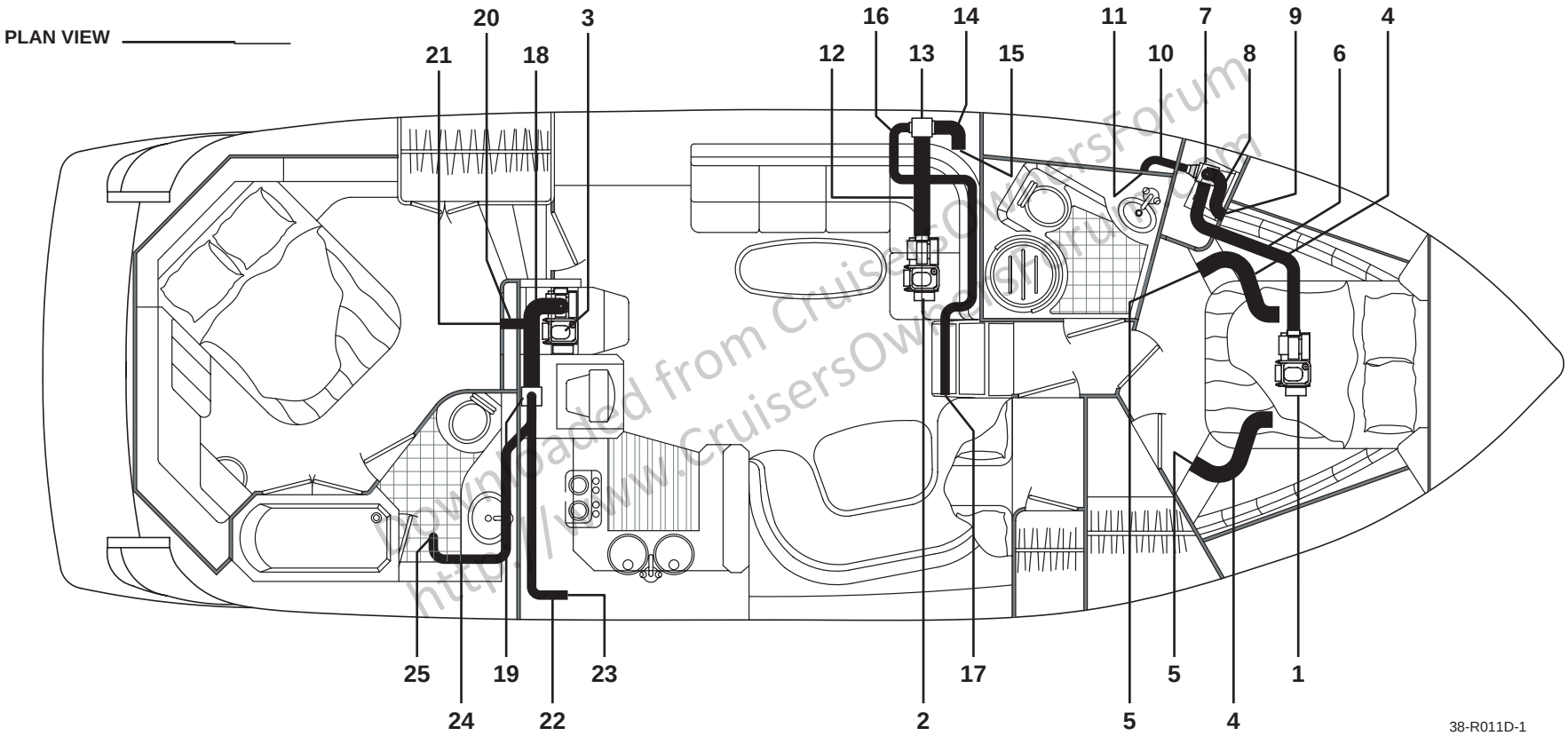
A/C LAYOUT



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A/C LAYOUT PARTS LIST

1. Forward Air Conditioning Unit (U.S.)
   Forward Air Conditioning Unit (C.E.)
2. Mid Air Conditioning Unit (U.S.)
   Mid Air Conditioning Unit (C.E.)
3. Aft Air Conditioning Unit (U.S.)
   Aft Air Conditioning Unit (C.E.)
4. Forward A/C Unit Return (7" dia.)
5. Forward A/C Return Vent, Beige (4" x 8")
6. Forward A/C Unit to Plenum (5" dia.)
7. Forward A/C Plenum Box
8. Forward A/C Plenum to FSR (5" dia.)
9. FSR A/C Vent, Cherry (4" x 8")
10. Forward A/C Plenum to Forward Head (3" dia.)
11. Forward Head A/C Vent, 3" Round
12. Mid A/C Unit to Plenum (7" dia.)
13. Mid A/C Plenum Box
14. Mid A/C Plenum to Salon (6" dia.)
15. Salon A/C Vent, Cherry (4" x 8")
16. Mid A/C Plenum to Third Stateroom (3" dia.)
17. Third Stateroom A/C Vent, 3" Round
18. Aft A/C Unit to Plenum (7" dia.)
19. Aft A/C Plenum Box
20. Aft A/C Plenum to ASR (5" dia.)
21. ASR A/C Vent, Cherry (4" x 8")
22. Aft A/C Plenum to Galley (4" dia.)
23. Galley A/C Vent, Cherry (4" x 8")
24. Aft A/C Plenum to Aft Head (3" dia.)
25. Aft Head A/C Vent, 3" Round
26. Aft A/C Unit Return Vent (12" x 12")
27. Mid A/C Unit Return Vent (16" x 8")

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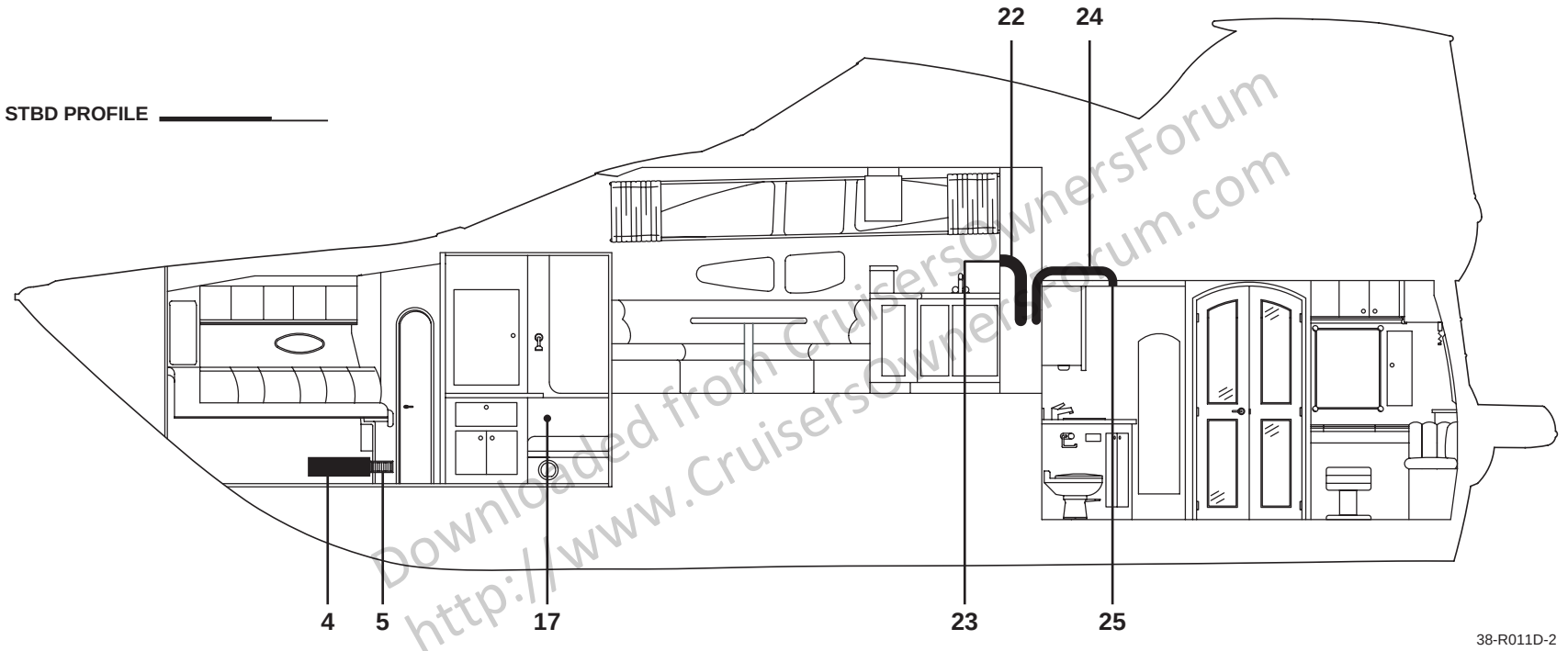
A/C STARBOARD LAYOUT



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A/C STARBOARD LAYOUT PARTS LIST

1. Forward Air Conditioning Unit (U.S.)
   Forward Air Conditioning Unit (C.E.)
2. Mid Air Conditioning Unit (U.S.)
   Mid Air Conditioning Unit (C.E.)
3. Aft Air Conditioning Unit (U.S.)
   Aft Air Conditioning Unit (C.E.)
4. Forward A/C Unit Return (7" dia.)
5. Forward A/C Return Vent, Beige (4" x 8")
6. Forward A/C Unit to Plenum (5" dia.)
7. Forward A/C Plenum Box
8. Forward A/C Plenum to FSR (5" dia.)
9. FSR A/C Vent, Cherry (4" x 8")
10. Forward A/C Plenum to Forward Head (3" dia.)
11. Forward Head A/C Vent, 3" Round
12. Mid A/C Unit to Plenum (7" Dia.)
13. Mid A/C Plenum Box
14. Mid A/C Plenum to Salon (6" dia.)
15. Salon A/C Vent, Cherry (4" x 8")
16. Mid A/C Plenum to Third Stateroom (3" dia.)
17. Third Stateroom A/C Vent, 3" Round
18. Aft A/C Unit to Plenum (7" dia.)
19. Aft A/C Plenum Box
20. Aft A/C Plenum to ASR (5" dia.)
21. ASR A/C Vent, Cherry (4" x 8")
22. Aft A/C Plenum to Galley (4" dia.)
23. Galley A/C Vent, Cherry (4" x 8")
24. Aft A/C Plenum to Aft Head (3" dia.)
25. Aft Head A/C Vent, 3" Round
26. Aft A/C Unit Return Vent (12" x 12")
27. Mid A/C Unit Return Vent (16" x 8")

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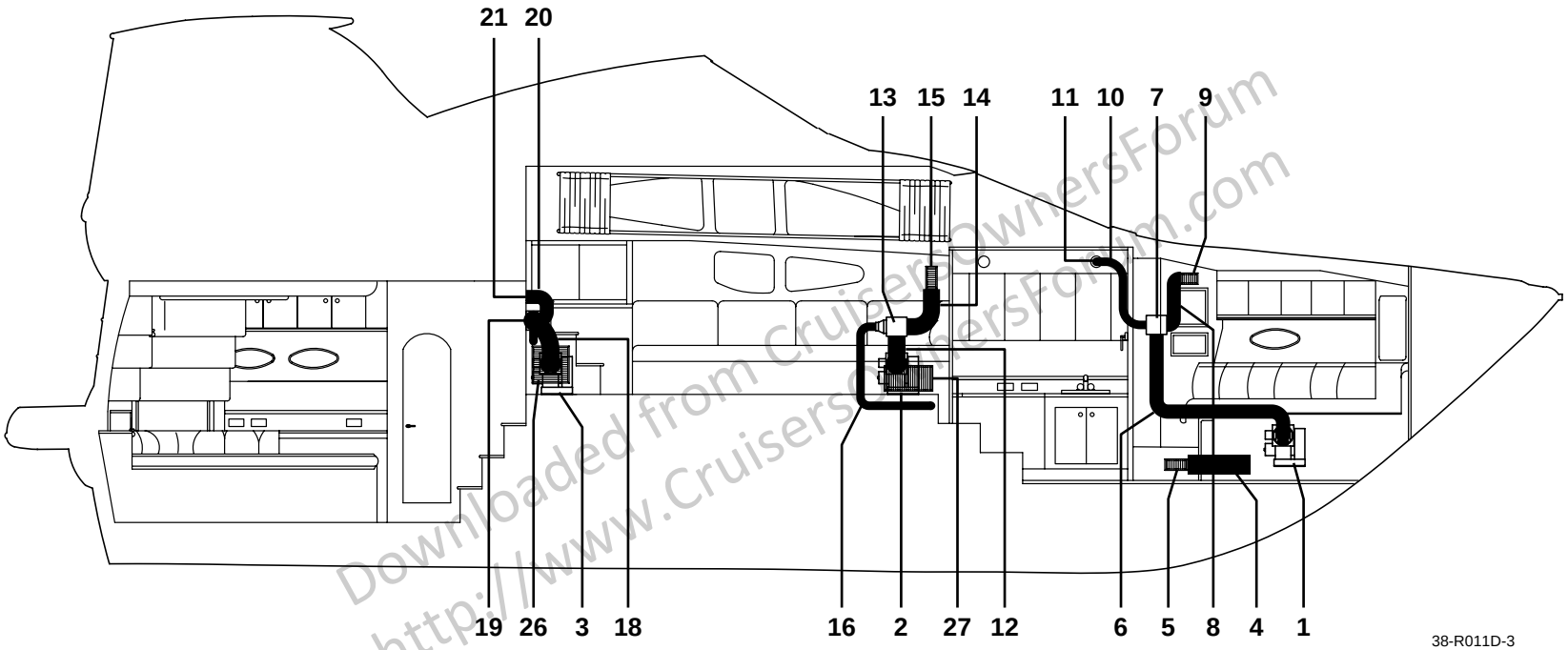
A/C PORT LAYOUT



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A/C PORT LAYOUT PARTS LIST

1. Forward Air Conditioning Unit (U.S.)
   Forward Air Conditioning Unit (C.E.)
2. Mid Air Conditioning Unit (U.S.)
   Mid Air Conditioning Unit (C.E.)
3. Aft Air Conditioning Unit (U.S.)
   Aft Air Conditioning Unit (C.E.)
4. Forward A/C Unit Return (7" dia.)
5. Forward A/C Return Vent, Beige (4" x 8")
6. Forward A/C Unit to Plenum (5" dia.)
7. Forward A/C Plenum Box
8. Forward A/C Plenum to FSR (5" dia.)
9. FSR A/C Vent, Cherry (4" x 8")
10. Forward A/C Plenum to Forward Head (3" dia.)
11. Forward Head A/C Vent, 3" Round
12. Mid A/C Unit to Plenum (7" dia.)
13. Mid A/C Plenum Box
14. Mid A/C Plenum to Salon (6" dia.)
15. Salon A/C Vent, Cherry (4" x 8")
16. Mid A/C Plenum to Third Stateroom (3" dia.)
17. Third Stateroom A/C Vent, 3" Round
18. Aft A/C Unit to Plenum (7" dia.)
19. Aft A/C Plenum Box
20. Aft A/C Plenum to ASR (5" dia.)
21. ASR A/C Vent, Cherry (4" x 8")
22. Aft A/C Plenum to Galley (4" dia.)
23. Galley A/C Vent, Cherry (4" x 8")
24. Aft A/C Plenum to Aft Head (3" dia.)
25. Aft Head A/C Vent, 3" Round
26. Aft A/C Unit Return Vent (12" x 12")
27. Mid A/C Unit Return Vent (16" x 8")

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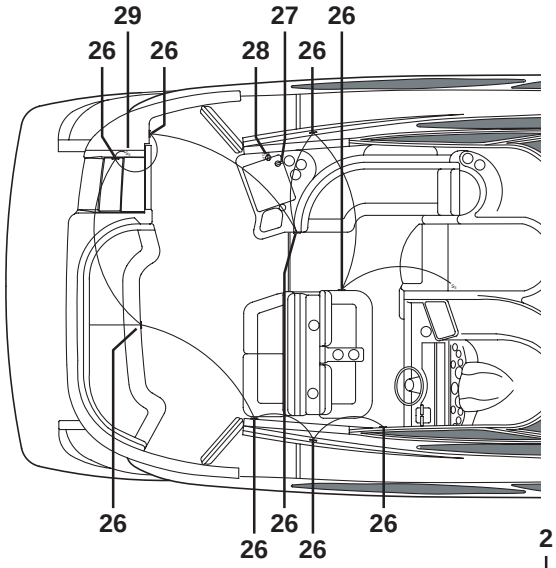
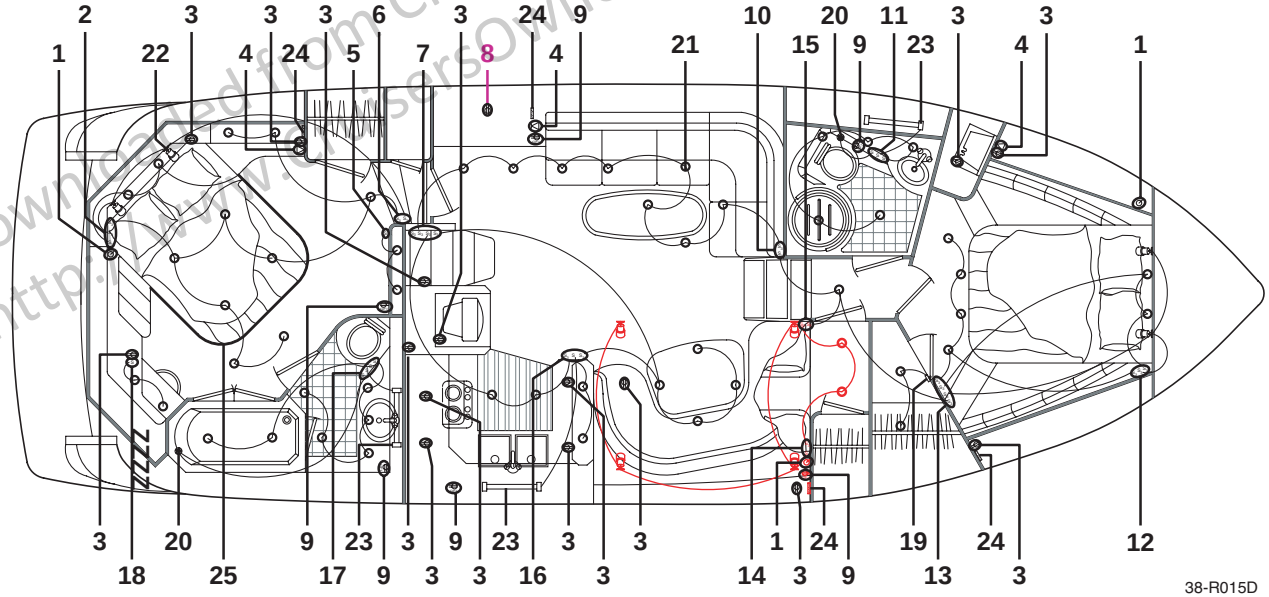
COCKPIT LIGHT PLAN LAYOUT/INTERIOR LIGHT PLAN LAYOUT

NOTE: Purple = optional equipment
Red = item located in the 3rd stateroom





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COCKPIT LIGHT PLAN LAYOUT/INTERIOR LIGHT PLAN LAYOUT PARTS LIST

Item	Description	Qty.
1	Plate, Wall, 3 Mod, Black, Plastic	3
	Control, Stereo Speaker	3
2	Frame, Support, 3 Module	1
	Plate, Wall, 3 Mod, Black, Plastic	1
	Switch, Light, SP, 2 Way	3
3	Box, Receptacle, Dual	15
	Receptacle, Dual, Black,, 120V	15
	Plate, Wall, Receptacle, Single	15
4	Frame, Support, 1 Module	3
	Plate, Wall, 1 Module, Black, Plastic	3
	Receptacle, Phone, 4 Pin, Module	3
5	Frame, Support, 1 Module	1
	Plate, Wall 1 Module, Black, Plastic	1
	Switch, Light, 1P, 1 Way	1
6	Frame, Support, 2 Module	1
	Plate, Wall, 3 Module, Black, Plastic	1
	Switch, Light, SP, 2 Way	2
7	Frame, Support, 4 Module	1
	Plate, Wall, 4 Module, Black, Plastic	1
	Switch, Light, SP, 2 Way	3
	Switch, Momentary, Off/Momentary	1
8	Box, Receptacle, Dual	1
	Receptacle, Dual, Black, 120V	1
	Plate, Wall, Receptacle, Single	1

Item	Description	Qty.
9	Box, Receptacle, Dual	6
	Receptacle, Dual, GFCI, 15 Amp, Black	6
	Plate, Wall, Receptacle, Single	6
10	Frame, Support, 2 Module	1
	Plate, Wall, 3 Module, Black, Plastic	1
	Switch, Light, SP, 2 Way	2
11	Frame, Support, 3 Module	1
	Switch, Light 1P, 1 Way	3
12	Frame, Support, 3 Module	1
	Plate, Wall, 3 Module, Black, Plastic	1
	Switch, Light, SP, 2 way	3
13	Frame, Support, 4 Module	1
	Plate, Wall, 4 Module, Black, Plastic	1
	Switch, Light, SP, 2 Way	4
14	Frame, Support, 2 Module	1
	Plate, Wall, 3 Module, Black, Plastic	1
	Switch, Light, SP, 2 Way	1
	Switch, Light, 1P, 1 Way	1
15	Frame, Support, 2 Module	1
	Plate, Wall, 3 Module, Black, Plastic	1
	Switch, Light, SP, 2 Way	2
16	Frame, Support, 3 Module	1
	Plate, Wall, 3 Module, Black, Plastic	1
	Switch, Light, SP, 2 Way	2
	Switch, Light, 1P, 1 Way	1

Item	Description	Qty.
17	Frame, Support, 4 Module	1
	Plate, Wall, 4 Module, Black, Plastic	1
	Switch, Light, 1P, 1 Way	4
18	Frame, Support, 1 Module	1
	Plate, Wall, 1 Module, Black, Plastic	1
	Switch, Light, 1P, 1 Way	1
19	Switch, Closet Light, Mom	1
20	Blower, Inline, 3"	2
21	Light, Overhead, Brushed Nickel/Brass	54
22	Light, Reading, Brushed Nickel/Brass	8
23	Light, Fluorescent, 25-1/2"	3
24	Detector, CO, Fireboy	4
25	Lighting Tube	-
26	Light, Courtesy, Exterior Oval	9
27	Box, Receptacle, Dual	1
	Receptacle, Dual, Black,, 120V	1
	Plate, Wall, Receptacle, Single	1
28	Box, Receptacle, Dual	1
	Receptacle, Dual, GFCI, 15 Amp, Black	1
	Cover, Receptacle, Weatherproof, S.S.	1
29	Box, Switch, 3 Module, Waterproof	1
	Switch, 1 Way, Vimor, Ivory	1
	Switch, Blank, Vimor, Ivory	1
	Switch, Push Button, Mom, Single	1

NOTE: Purple = optional equipment
Red = item located in the 3rd stateroom

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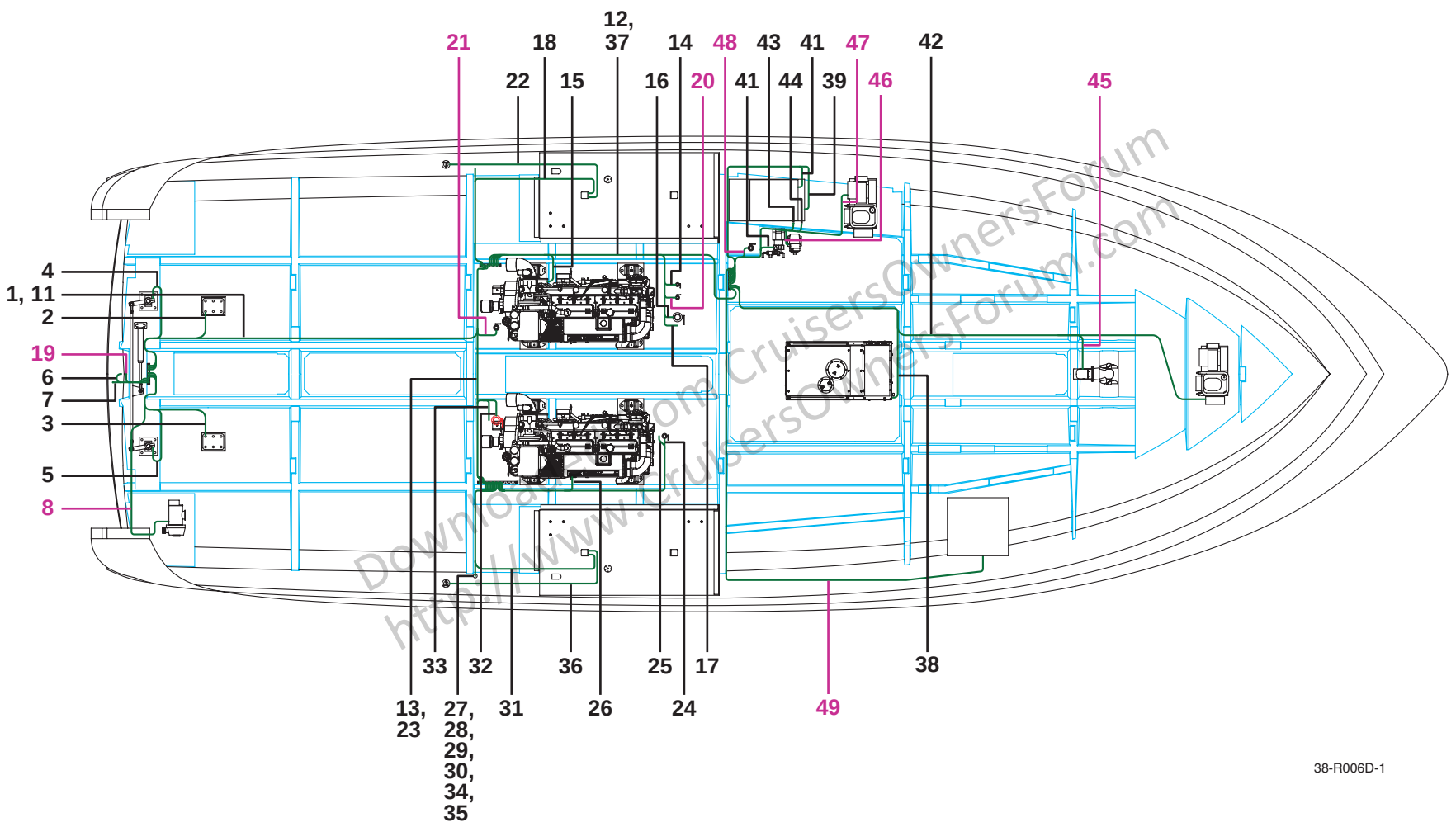
HULL BONDING WIRE LAYOUT



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HULL BONDING WIRE LAYOUT PARTS LIST

WIRE NO.	LENGTH (IN.)	FROM	TO
1	168	Buss Bar Transom (Jumper)	Buss Bar Port Engine Room (Jumper)
2	60	Buss Bar Transom	Port Strut Plate
3	60	Buss Bar Transom	Stbd Strut Plate
4	45	Buss Bar Transom	Port Rudder Tiller Arm
5	45	Buss Bar Transom	Stbd Rudder Tiller Arm
6	24	Buss Bar Transom	Zinc Plate
7	180	Buss Bar Transom	Cockpit Icemaker
8	72	Buss Bar Transom	Whirlpool Pump
9	120	Buss Bar Transom	Hydraulic Swim Platform Pump
10	24	Buss Bar Transom	Cockpit Washdown Seacock
11	168	Buss Bar Port Engine Room (Jumper)	Buss Bar Transom Jumper
12	108	Buss Bar Port Engine Room (Jumper)	Buss Bar Forward Jumper
13	108	Buss Bar Port Engine Room (Jumper)	Buss Bar Stbd Engine Room Jumper
14	90	Buss Bar Port Engine Room	Air Conditioner Seacock
15	40	Buss Bar Port Engine Room	Port Engine
16	106	Buss Bar Port Engine Room	Port Engine Seacock
17	106	Buss Bar Port Engine Room	Port Engine Seacock Strainer
18	168	Buss Bar Port Engine Room	Port Fuel Tank
19	72	Buss Bar Port Engine Room	Cockpit Washdown Seacock
20	36	Buss Bar Port Engine Room	Cockpit Air Conditioning Seacock
21	72	Buss Bar Port Engine Room	Aft Macerator Seacock
22	144	Port Fuel Tank	Port Fuel Fill Deck Plate
23	108	Buss Bar Stbd Engine Room (Jumper)	Buss Bar Port Engine Room (Jumper)

WIRE NO.	LENGTH (IN.)	FROM	TO
24	114	Buss Bar Stbd Engine Room	Generator Seacock
25	114	Buss Bar Stbd Engine Room	Generator Seacock Strainer
26	40	Buss Bar Stbd Engine Room	Stbd Engine
27	228	Buss Bar Stbd Engine Room	Galley Stove
28	228	Buss Bar Stbd Engine Room	Galley Microwave
29	180	Buss Bar Stbd Engine Room	Galley Refrigerator
30	228	Buss Bar Stbd Engine Room	Hardtop
31	168	Buss Bar Stbd Engine Room	Stbd Fuel Tank
32	72	Buss Bar Stbd Engine Room	Stbd Engine Seacock
33	72	Buss Bar Stbd Engine Room	Stbd Engine Seacock Strainer
34	120	Buss Bar Stbd Engine Room	Aft Air Conditioning Unit
35	228	Buss Bar Stbd Engine Room	Dash
36	144	Stbd Fuel Tank	Stbd Fuel Fill Deck Plate
37	108	Buss Bar Forward (Jumper)	Buss Bar Port Engine Room (Jumper)
38	108	Buss Bar Forward	Generator Unit
39	36	Buss Bar Forward	Bottom Water Heater
40	72	Buss Bar Forward	Top Water Heater
41	18	Buss Bar Forward	Air Conditioner Pump
42	324	Buss Bar Forward	Forward A/C Unit
43	60	Buss Bar Forward	Battery Charger
44	72	Buss Bar Forward	Battery Charger 2
45	276	Buss Bar Forward	Bow Thruster
46	60	Buss Bar Forward	Cockpit Air Conditioning Pump
47	120	Buss Bar Forward	Cockpit Air Conditioning Unit
48	36	Buss Bar Forward	Forward Macerator
49	396	Buss Bar Forward	Washer/Dryer

NOTE: Purple = optional equipment

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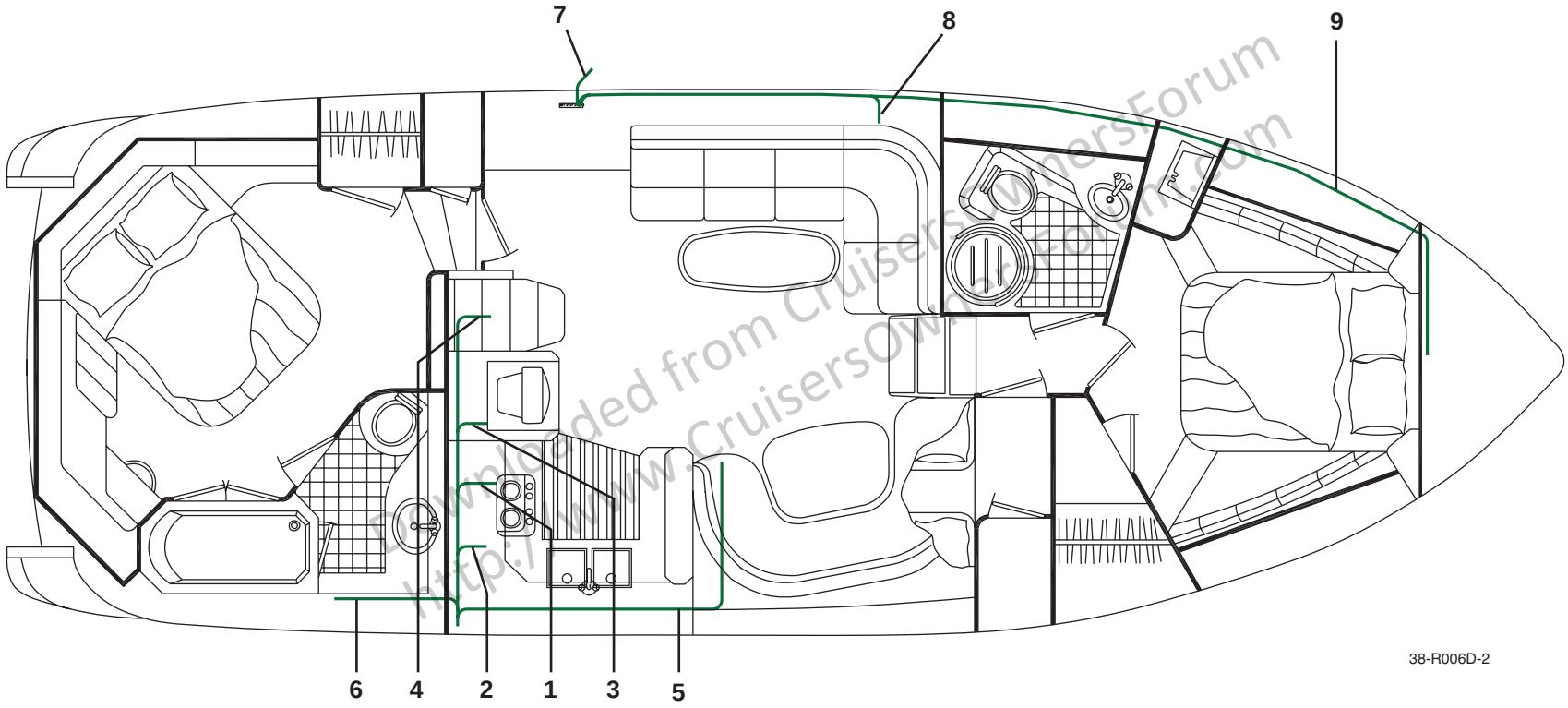
INTERIOR BONDING WIRE LAYOUT



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INTERIOR BONDING WIRE LAYOUT PARTS LIST

WIRE NO.	LENGTH (IN.)	FROM	TO
1	228	Buss Bar Stbd Engine Room	Galley Stove
2	228	Buss Bar Stbd Engine Room	Galley Microwave
3	180	Buss Bar Stbd Engine Room	Galley Refrigerator
4	120	Buss Bar Stbd Engine Room	Aft Air Conditioning Unit
5	-	Buss Bar Stbd Engine Room	Central Vacuum
6	-	Buss Bar Stbd Engine Room	Cockpit A/C Unit Diffuser
7	-	Buss Bar DC Panel	Bow Rails
8	-	Buss Bar DC Panel	Mid Air Conditioning Unit
9	-	Buss Bar DC Panel	Windlass

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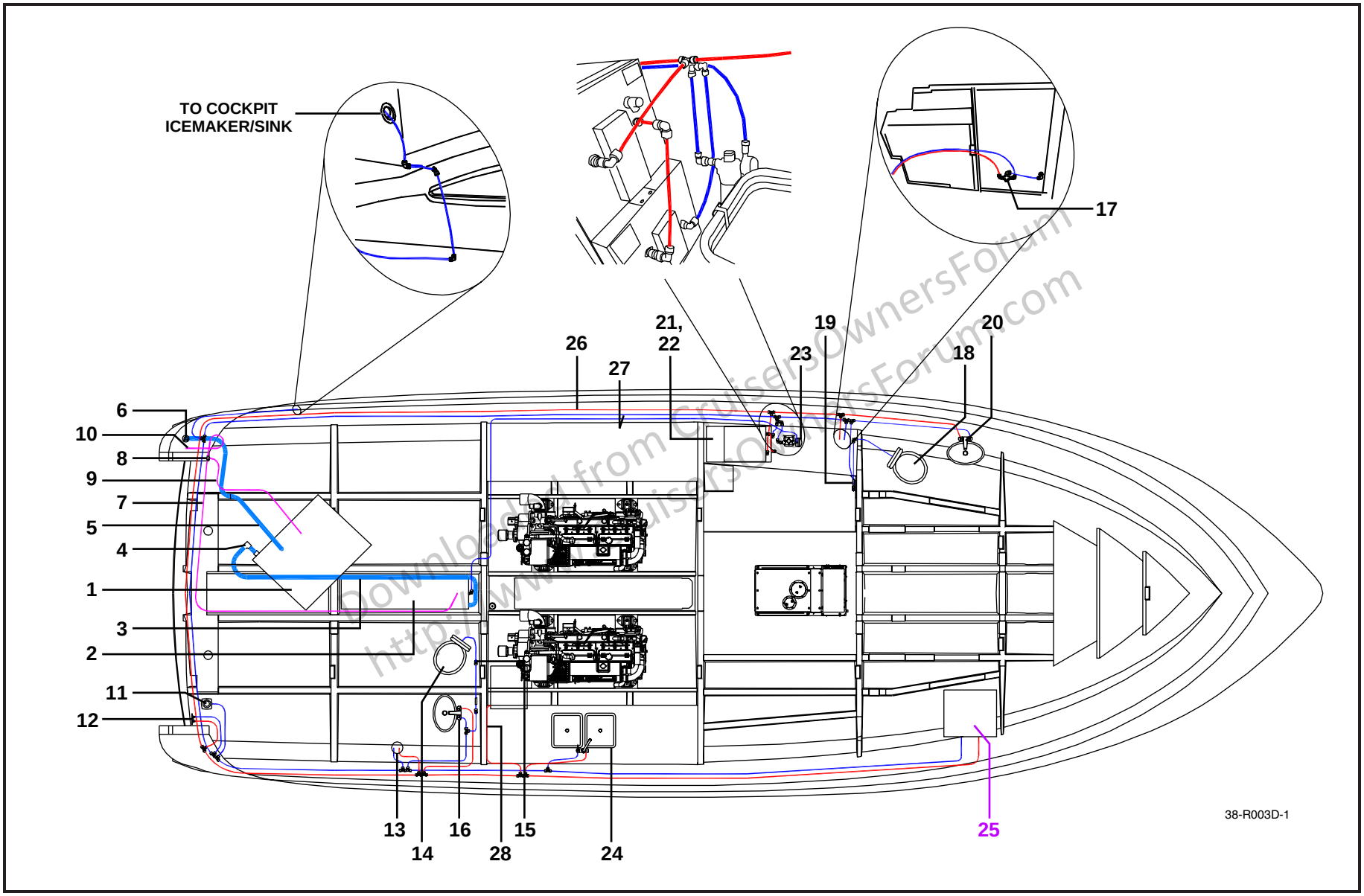
FRESH WATER LAYOUT



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FRESH WATER LAYOUT PARTS LIST

1. Aft Water Tank (84 Gallon)
2. Forward Water Tank (50 Gallon)
3. Aft Water Tank to Forward Water Tank (1-1/2" dia.)
4. 1-1/2" Elbow
5. Water Fill Hose to Deck Plate (1-1/2" dia.)
6. Water Fill Deck Plate
7. Forward Water Tank Vent Hose to Tee (5/8" dia.)
8. Water Tank Vent Tee
9. Aft Water Tank Vent Hose to Tee (5/8" dia.)
10. Water Tank Vent Hose to Vent (5/8" dia.)
11. City Water Inlet
12. Transom Shower
13. Aft Head Shower Mixer
14. Aft Head Unit (Tall)
15. Aft Head Solenoid
16. Aft Head Faucet
17. Forward Head Shower Mixer
18. Forward Head Unit (Short)
19. Forward Head Solenoid
20. Forward Head Faucet
21. Water Heater (11 Gallon)
22. Water Heater (20 Gallon)
23. Water Pump
24. Galley Faucet
25. Washer Dryer Unit (U.S.)
    Washer Dryer Unit (C.E.)
26. Waterline, Hot, Red (1/2" dia.)
27. Waterline, Cold, Blue (1/2" dia.)
28. Dishwasher

NOTE: Purple = optional equipment

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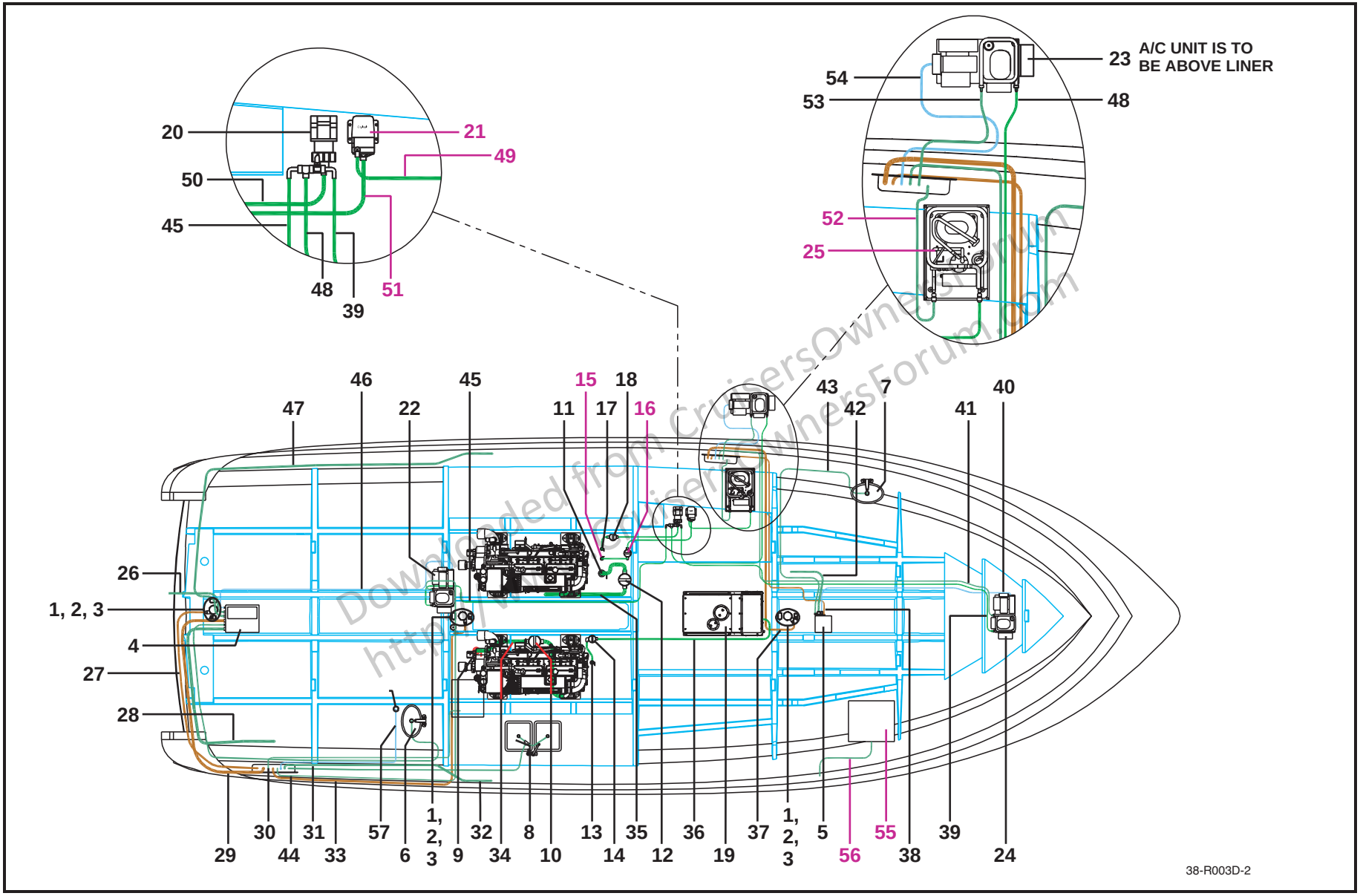
RAW WATER LAYOUT



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RAW WATER LAYOUT PARTS LIST

1. Bilge Pump, 2200 GPH
2. Bilge Pump Float Switch
3. High Water Alarm Switch
4. Aft Shower Sump Pump
5. Forward Shower Sump Pump
6. Aft Head Sink
7. Forward Head Sink
8. Galley Sink
9. Starboard Engine Seacock, 2"
10. Starboard Engine Strainer, 2"
11. Port Engine Seacock, 2"
12. Port Engine Strainer, 2"
13. Generator Seacock
14. Generator Strainer
15. Cockpit A/C Seacock, 3/4"
16. Cockpit A/C Strainer, 3/4"
17. Air Conditioning Seacock, 3/4"
18. Air Conditioning Strainer, 3/4"
19. Generator Unit
20. Air Conditioning Pump
21. Cockpit A/C Pump
22. Forward Air Conditioning Unit (U.S.)
    Forward Air Conditioning Unit (C.E.)
23. Mid Air Conditioning Unit (U.S.)
    Mid Air Conditioning Unit (C.E.)
24. Aft Air Conditioning Unit (U.S.)
    Aft Air Conditioning Unit (C.E)
25. Cockpit A/C Unit, FX24C3-P
26. Cockpit Drain (1-1/8" dia.)
27. Aft Bilge Pump Hose (1-1/8" dia.)
28. Aft Tub Drain (1-1/2" dia.)
29. Aft Shower Sump Drain (1-1/2" dia.)
30. Aft Head Sink Drain (3/4" dia.)
31. Galley Sink Drain (3/4" dia.)
32. Starboard Vent Box Drain (1-1/8" dia.)
33. Mid Bilge Pump Drain (1-1/8" dia.)
34. Starboard Engine Raw Water Hose (2" dia.)
35. Port Engine Raw Water Hose (2" dia.)
36. Generator Raw Water Hose (1" dia.)
37. Forward Bilge Pump Drain (1-1/8" dia.)
38. Forward Shower Sump Drain (3/4" dia.)
39. Forward A/C Unit Raw Water (5/8" dia.)
40. Forward A/C Unit Condensation (5/8" dia.)
41. Forward A/C Unit Drain Hose (5/8" dia.)
42. Forward Shower Drain (1-1/8" dia.)
43. Forward Head Sink Drain (3/4" dia.)
44. Aft A/C Unit Drain (5/8" dia.)
45. Aft A/C Unit Raw Water (5/8" dia.)
46. Aft A/C Unit Condensation (5/8" dia.)
47. Port Vent Box Drain (1-1/8" dia.)
48. Mid A/C Unit Raw Water (5/8" dia.)
49. Cockpit A/C Raw Water (5/8" dia.)
50. A/C Pump Raw Water (5/8" dia.)
51. Cockpit A/C Pump Raw Water (5/8" dia.)
52. Cockpit A/C Unit Drain (5/8" dia.)
53. Mid A/C Unit Drain (5/8" dia.)
54. Mid A/C Unit Condensation (5/8" dia.)
55. Washer Dryer Unit (U.S.)
    Washer Dryer Unit (C.E.)
56. Washer Dryer Drain (3/4" dia.)
57. Cockpit A/C Unit Condensation (5/8" dia.)

NOTE: Purple = optional equipment

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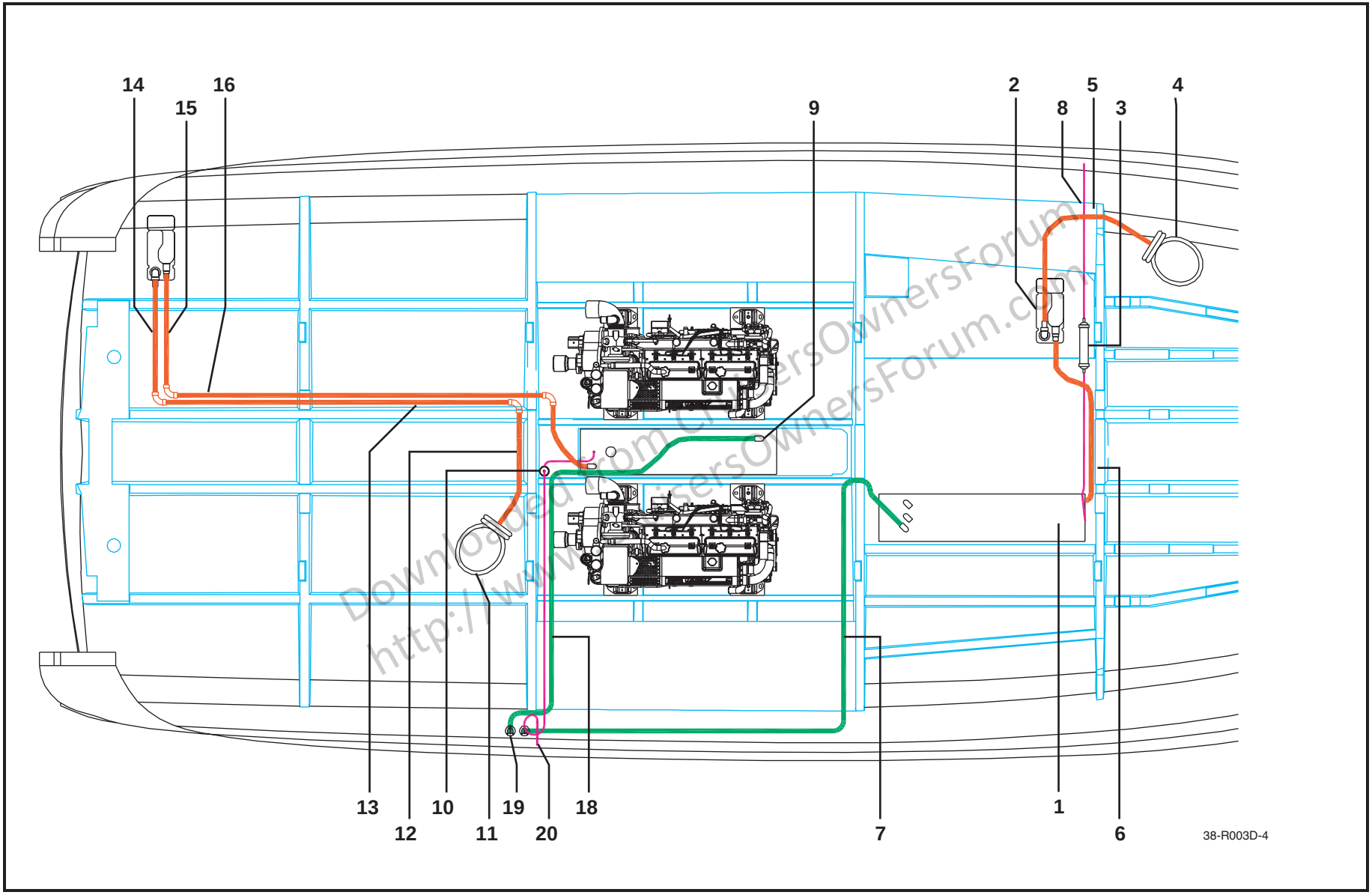
WASTE LAYOUT



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WASTE LAYOUT PARTS LIST

1. Forward Waste Tank (50 Gallon)
2. Forward Generator
3. Forward Waste Tank Vent Filter
4. Forward Head Unit (Short)
5. Forward Head Unit to Head Hose (1-1/2" dia.)
6. Forward Head to Waste Tank Hose (1-1/2" dia.)
7. Forward Waste Tank Pump Out Hose (1-1/2" dia.)
8. Forward Waste Tank Vent Hose (5/8" dia.)
9. Aft Waste Tank (50 Gallon)
10. Aft Waste Tank Vent Filter
11. Aft Head Unit (Tall)
12. Aft Head Unit to PVC (1-1/2" dia.)
13. 1-1/2" PVC Pipe to Head Hose (1-1/2" dia.)
14. Head Hose to Generator (1-1/2" dia.)
15. Head Hose to Generator (To Tank) (1-1/2" dia.)
16. 1-1/2" PVC Pipe to Tank Hose (1-1/2" dia.)
17. Tank Hose to Tank (1-1/2" dia.)
18. Aft Waste Tank Pump Out Hose (1-1/2" dia.)
19. Waste Pump Out Deck Plate
20. Aft Waste Tank Vent Hose (5/8" dia.)

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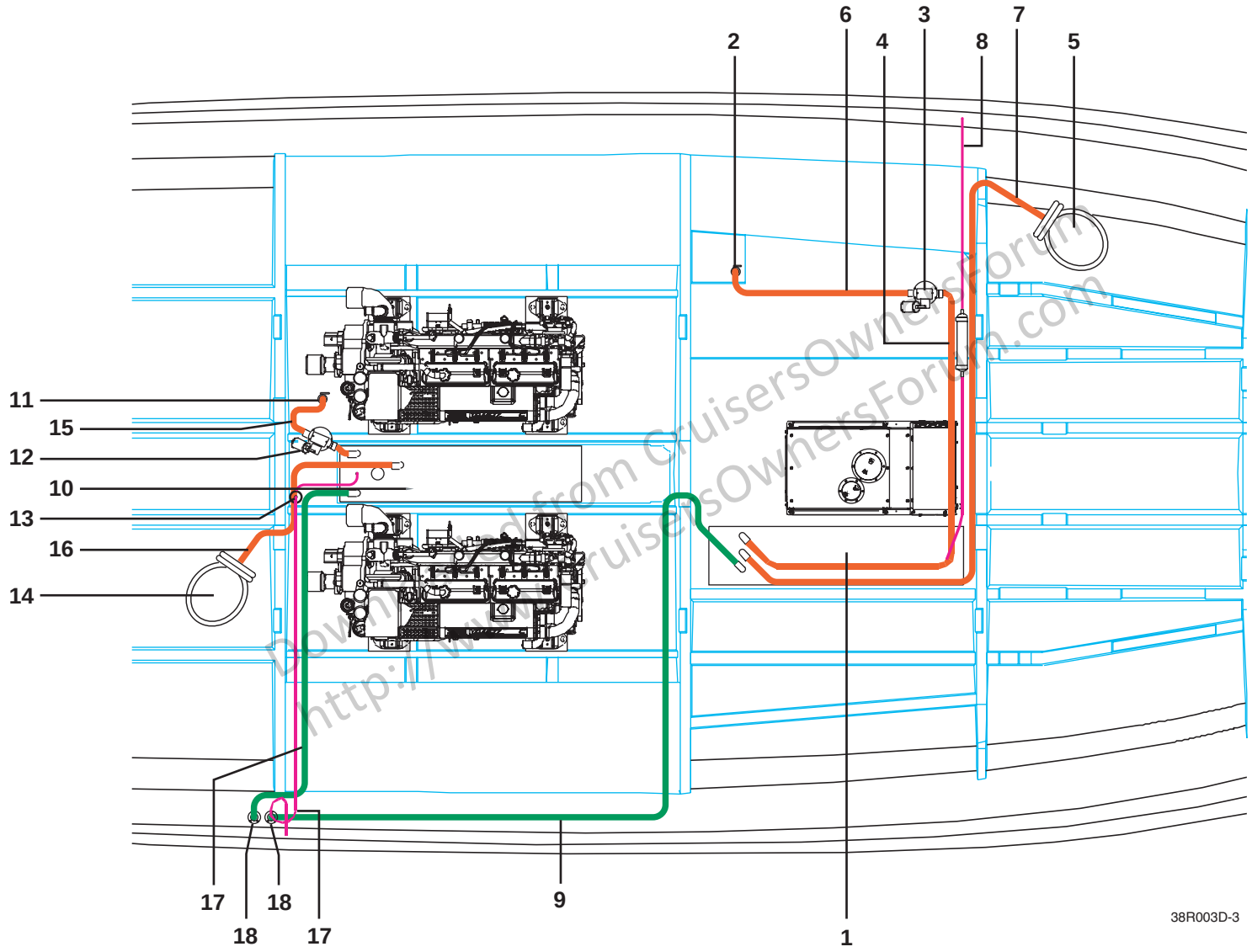
WASTE LAYOUT (ELECTRIC)



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WASTE LAYOUT (ELECTRIC) PARTS LIST

1. Forward Waste Tank (50 Gallon)
2. Forward Macerator Seacock (1-1/2" dia.)
3. Forward Macerator Unit
4. Forward Waste Tank Vent Filter
5. Forward Head Unit (Short)
6. Forward Waste Tank to Macerator Hose (1-1/2" dia.)
7. Forward Waste Tank to Forward Head Unit (1-1/2" dia.)
8. Forward Waste Tank Vent Hose (5/8" dia.)
9. Forward Waste Tank Pump Out Hose (1-1/2" dia.)
10. Aft Waste Tank (50 Gallon)
11. Aft Macerator Seacock (1-1/2" dia.)
12. Aft Macerator Unit
13. Aft Waste Tank Vent Filter
14. Aft Head Unit (Tall)
15. Aft Waste Tank to Macerator Hose (1-1/2" dia.)
16. Aft Waste Tank to Aft Head Unit (1-1/2" dia.)
17. Aft Waste Tank Vent Hose (5/8" dia.)
18. Aft Waste Tank Pump Out Hose (1-1/2" dia.)
19. Waste Pump Out Deck Plate

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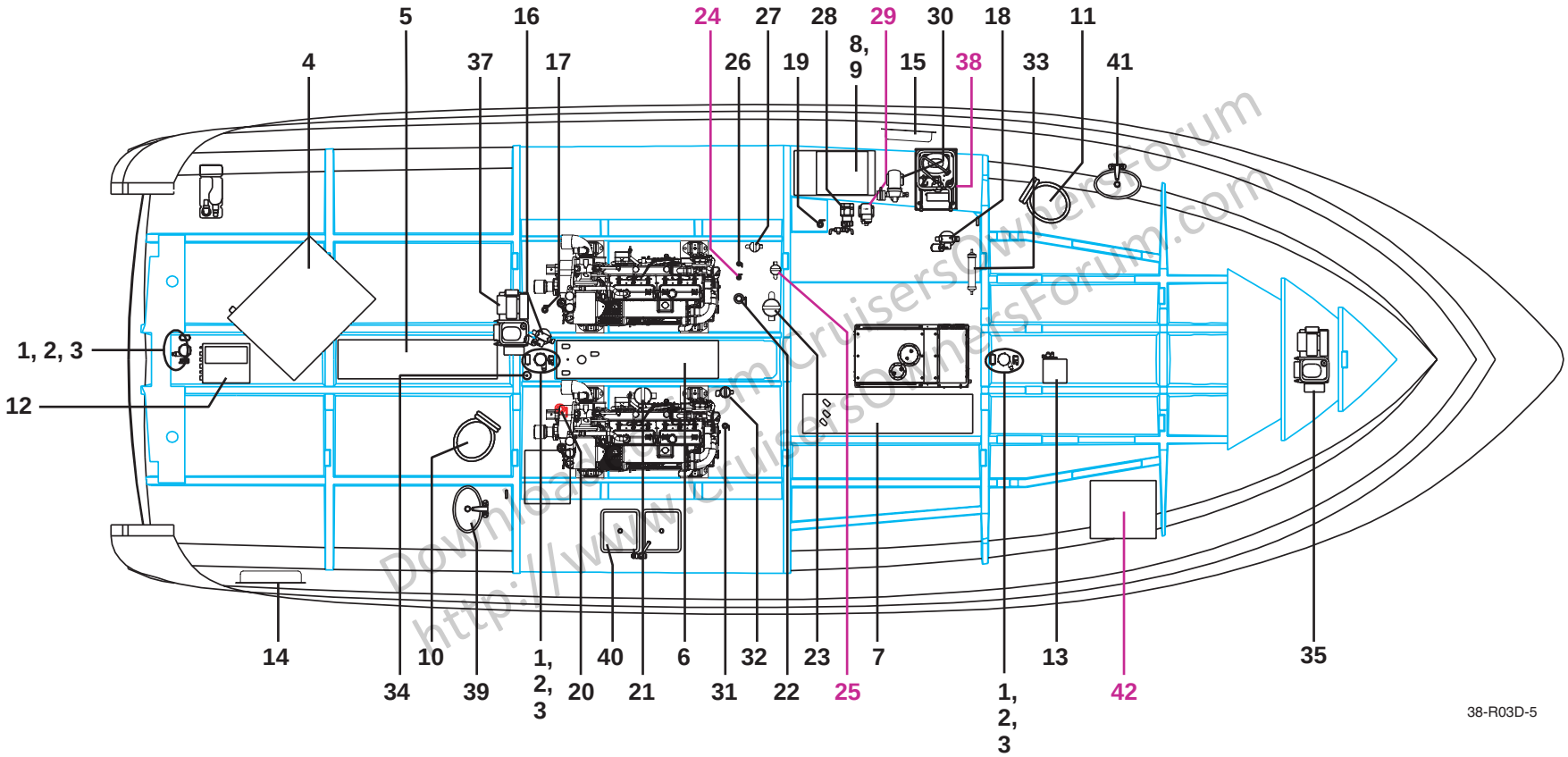
PLUMBING HARDWARE LAYOUT



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PLUMBING HARDWARE LAYOUT PARTS LIST

1. Bilge Pump, 2200 GPH
2. Bilge Pump Float Switch
3. High Water Alarm Switch
4. Aft Water Tank (84 Gallon)
5. Forward Water Tank (50 Gallon)
6. Aft Waste Tank (42 Gallon)
7. Forward Waste Tank (50 Gallon)
8. Water Heater (11 Gallon)
9. Water Heater (20 Gallon)
10. Aft Head Unit (Tall)
11. Forward Head Unit (Short)
12. Aft Shower Sump Pump
13. Forward Shower Sump Pump
14. Aft Starboard Plenum Box
15. Forward Port Plenum Box
16. Aft Waste Tank Macerator
17. Aft Macerator Seacock (1-1/2" dia.)
18. Forward Waste Tank Macerator
19. Forward Macerator Seacock (1-1/2" dia.)
20. Starboard Engine Raw Water Seacock (2" dia.)
21. Starboard Engine Raw Waste Strainer (2" dia.)
22. Port Engine Raw Water Seacock (2" dia.)
23. Port Engine Raw Water Strainer (2" dia.)
24. Cockpit A/C Seacock (3/4" dia.)
25. Cockpit A/C Strainer (3/4" dia.)
26. Air Conditioner Seacock (3/4" dia.)
27. Air Conditioner Strainer (3/4" dia.)
28. Air Conditioning Pump
29. Cockpit A/C Pump
30. Water Pump
31. Generator Seacock
32. Generator Strainer
33. Forward Waste Tank Vent Filter
34. Aft Waste Tank Vent Filter
35. Forward Air Conditioning Unit (U.S.)
    Forward Air Conditioning Unit (C.E.)
36. Mid Air Conditioning Unit (U.S.)
    Mid Air Conditioning Unit (C.E.)
37. Aft Air Conditioning Unit (U.S.)
    Aft Air Conditioning Unit (C.E.)
38. Cockpit A/C Unit, FX24C3-P
39. Aft Head Sink
    Aft Head Faucet
40. Galley Sink
    Galley Faucet
41. Forward Head Sink
    Forward Head Faucet
42. Washer Dryer Unit (U.S.)
    Washer Dryer Unit (C.E.)

NOTE: Purple = optional equipment
Item #36 is above the liner in the Salon area.

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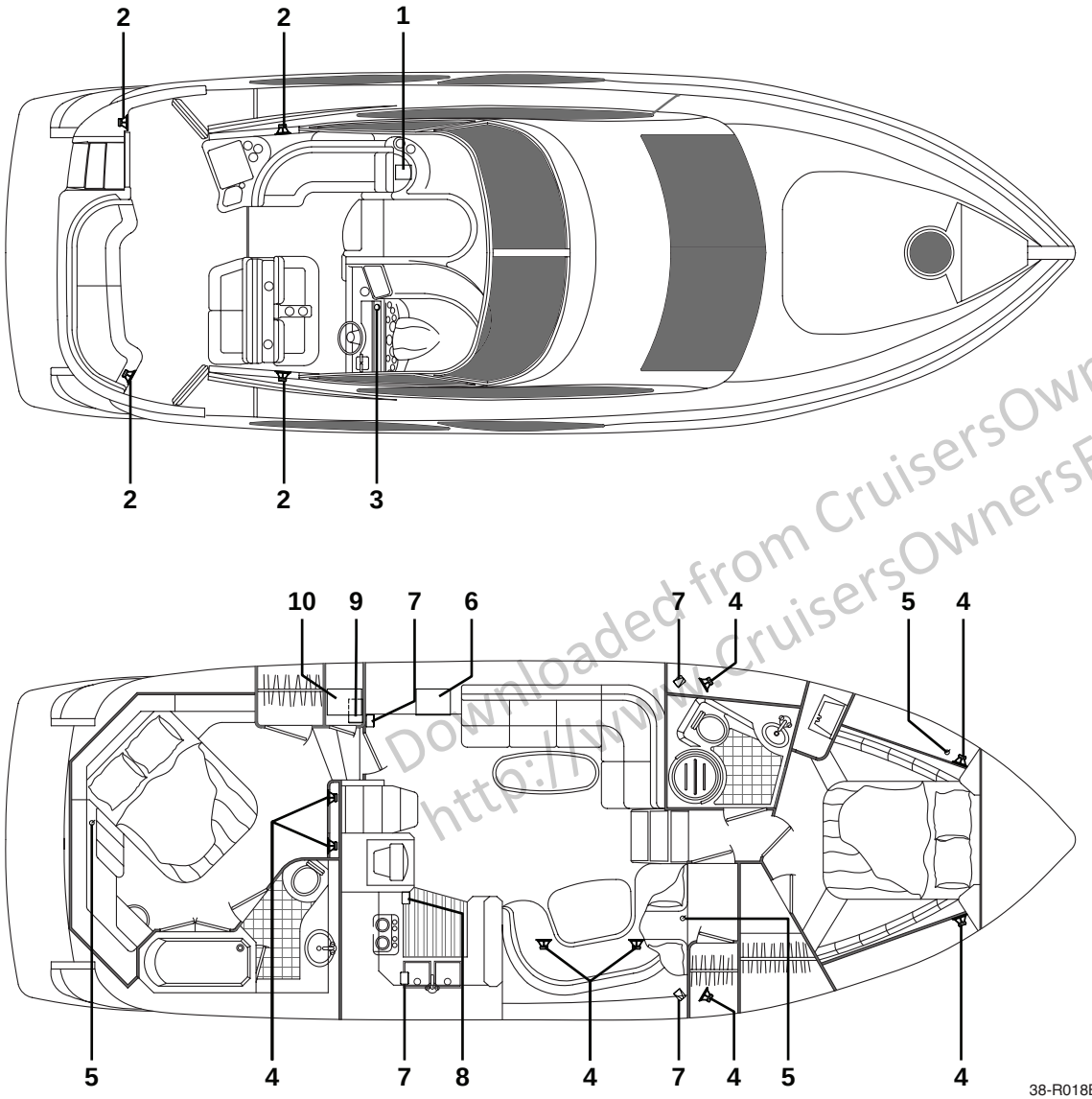
STEREO LAYOUT



1. Clarion Head Unit
2. 6-1/2" Exterior Speaker
3. Stereo Remote
4. 6-1/2" Interior Speaker
5. Fader Switch
6. Panasonic 5 Disc Changer
7. Satellite Speaker
8. Center Channel Speaker
9. Subwoofer
10. Amplifier

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A Word About Galvanic Corrosion

Galvanic corrosion is the decomposition of compounds, such as metals, exposed to an electric current. For boat owners, galvanic corrosion is a common occurrence. Using a shore power AC electrical system on the boat includes an earth ground circuit that “grounds" all onboard metal parts to the earth on shore. This circuit provides the protection against hazardous shocks but unfortunately it can also create stray DC currents which cause the decomposition of all submerged metal.

SOLUTIONS TO GALVANIC CORROSION

IMPORTANT

It is your responsibility to periodically inspect and replace the sacrificial zinc anodes. Damage resulting from galvanic corrosion is not covered by the warranty. Additional zinc anodes may need to be installed on your boat as recommended for your region.

Sacrificial zinc anodes, installed at the factory, protect the hardware that is exposed to the water. Galvanic corrosion attacks the least “noble” metals first. Because zinc is a less “noble” metal it will decompose before the more “noble” metals. Your dealer may install additional zinc anodes to areas such as the rudders. Check these zincs periodically, and have them replaced as needed. See your dealer for parts and service.

A Galvanic Isolator is installed in the green bonding wire between the yacht and the dockside ground to prevent the flow of relatively low electrolytic stray currents. It will, however, provide a path for catastrophic, short-circuit currents which are sufficient to actuate circuit breakers.

A Word About Bonding

Cruisers Yachts uses a copper bonding strip in the engine compartment. All metal parts of your boat, the radar arch, the rudder shaft, the bowrails, etc. are bonded to this common ground. The terminal strip located behind the dash panel is linked to the landing strip via a single #6 green wire. The AC and DC ground wires also are connected to the bonding strip.

Bonding provides a common ground for all electrical systems on the boat.

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FRESHWATER SYSTEM

Freshwater Tank

The boat is fitted with both an 85 gallon and 50 gallon freshwater tank. They are filled through a fill plate located on the port stern. The tanks are vented through the hull. This allows air to enter/escape as water levels rise and fall.

IMPORTANT

Fill the tank only with potable water. Using and refilling the tank often will help keep it a source of clean drinking water.

FILTER AND PUMP

Water is drawn from the tanks by a self-priming pump located on the port side of the generator room. Before entering the pump, the water passes through a filter to capture any contaminants. The pump provides a flow of water at a preset pressure to the remainder of the system.

INITIAL STARTUP

1. Fill the freshwater tank with approximately 50 gallons of potable water.
2. Turn the FRESHWATER PUMP breaker on.

3. Open the cold water galley faucet to allow air to escape. Close the faucet when a steady flow of water is apparent.
4. Open the hot water galley faucet to fill the water heater and allow air to escape from the line. Close the faucet when a steady flow of water is apparent.
5. Bleed air from the remainder of the faucets in the same manner as steps 3 and 4. After all lines have been bled, the pump will build to operating pressure and then shut off.
6. You may now continue to fill the tanks to their capacity of 135 gallons.

City Water Hookup

CAUTION

Monitor the water system during initial usage of the "city water" feature. In this mode the boat is connected to an unlimited source of water. NEVER leave boat unattended while using the "city water" feature. Any major leak or break in the system will allow abnormal bilge accumulation which in turn could cause sinking or swamping of batteries and engine. Damage from swamping and/or submergence are not covered by warranty.

As an alternative to your freshwater tank, the freshwater system can be connected to "city water" at the receptacle on the starboard stern. Because the water enters the boat under pressure, it bypasses the tank, the filter and the pump.

NOTE

Using "city water" hookup does not replenish water supply in the tank. The tank can only be filled at the freshwater fill plate.

When using a dockside hookup, you will have to bleed all the lines as you did in initial start-up for the freshwater tank system.

Water Heater

The water heater is equipped with a high pressure relief valve for safety and a thermostat that regulates the heater to a specific water temperature. The thermostat is adjustable to suit individual taste. The electric water heater is operated by turning on the WATER HEATER breaker switch located on the AC panel. The electric water heater provides fast recovery and is capable of reheating a tank quite rapidly.

CAUTION

Do not turn the hot water switch on unless the freshwater system is charged. Damage to the heating element will result if allowed to heat up with no water in the system.

HEAD AND WASTE CONTAMINANT SYSTEM

Your 455 Series Boat is equipped with a head and waste system that uses pumps with (2) 50 gallon holding tanks.

The head on your boat may be equipped with a system which draws water in through the fresh water system and flushes waste water from the marine toilet. The toilet pumps the waste water into a holding tank.

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Waste Holding Tank

One of the 50 gallon waste tanks is located under the floor in the engine room, and the other is located under the caves port bunk. Waste is pumped from the head through a sanitary waste hose to the top portion of the tanks. A 1-1/2" sanitary waste hose is attached to the bottom of each tank and runs to the fore and aft dockside pumpout plate on the starboard side of the deck walk-around. An overboard vent keeps the tank at atmospheric pressure regardless of waste levels.

All the components which comprise the waste system are made of materials specially formulated to prevent odor permeation and to resist chemical actions. It is strongly recommended that you regularly add chemical to your tank by flushing it through the head. The chemical helps to control odor and break down the waste. Follow the manufacturer's instructions on the chemical before using.

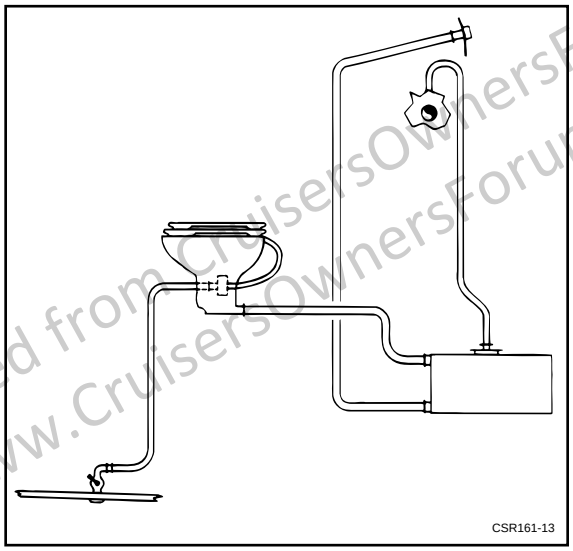
CAUTION

Do not flush into a full holding tank. Attempting to flush the head when the tank is full could result in damage to the waste system.

A waste tank indicator is also installed to provide a visual indication of the amount of waste in the tank. The indicator is located at the AC/DC panel.

Waste Disposal

DOCKSIDE PUMPOUT



This system directs all waste to the (2) 50 gallon holding tanks. To clear the tanks of waste water, you will need to use the dockside pumpout services provided at marinas, etc.

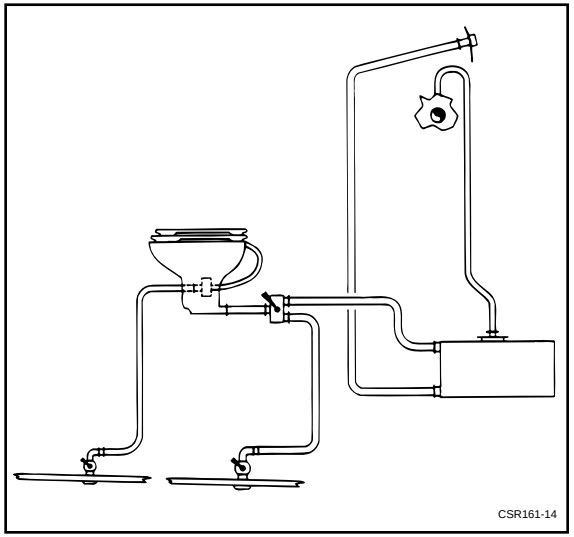
To clear the tanks of waste, hook a suction hose to the pumpout plates on the starboard walk around of the boat and to the dockside pump. The marina will handle the proper disposal of the waste.

OVERBOARD DISCHARGE

A valve is installed between the marine toilet and the waste holding tank. The valve can direct the flow of waste to the holding tank, or to an outlet seacock for overboard discharge of waste.

IMPORTANT

Overboard discharge of waste should only be used in approved areas. It is your responsibility to comply with local regulations regarding the discharge of waste.



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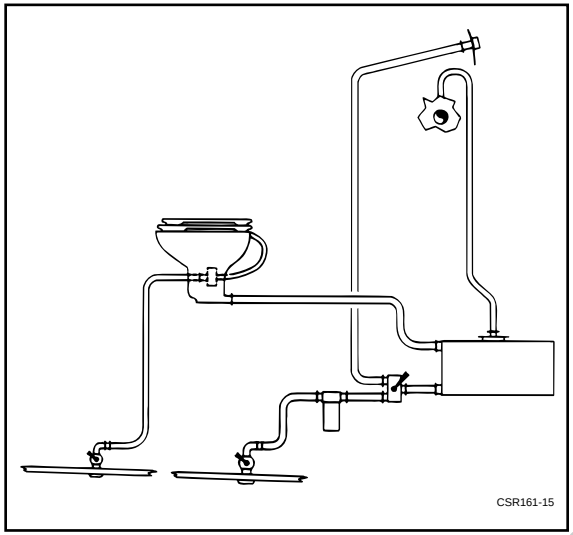
To operate overboard discharge, the valve lever must be in the overboard position and the waste water outlet seacock must be open. Close the outlet water seacock when not in use.

MACERATOR PUMP



There has been an extra hose added to your waste tanks. This is for the macerator. The aft macerator pump is located on the aft end of the waste tank. The forward macerator pump is located in the forward port corner in the generator room. In this configuration all waste is flushed from the head to the holding tank. You are able to use either the pumpout feature by using the deckplate, or the macerator to pump waste from the holding tank directly overboard.

IMPORTANT

Overboard discharge of waste should only be used in approved areas. It is your responsibility to comply with local regulations regarding the discharge of waste.

To pump out the holding tank using the macerator pump:

1. Open the 1" seacock labeled MACERATOR DISCHARGE. The seacocks for the forward and aft 50 gallon tanks are located on the AFT Port side of the generator room.

CAUTION

Do not run the pump dry. Running the pump when there is no waste to pump out of the holding tank will shorten the life of the pump.

2. Activate the macerator pump. Close the circuit marked MACERATOR from the DC panel. A full tank can be emptied in approximately three minutes.

3. Close the macerator discharge seacock after the pumpout is complete.

Head Operating Instructions

INITIAL OPERATION

1. Fill freshwater tank and add deodorant to holding tank through toilet bowl.

2. Make sure that all guests understand the operation of the system and the instruction label is in plain sight and easy for guests to read.

3. Remember, the vacuum pump starts automatically. Shut off the electrical power to the system before servicing and DO NOT leave the yacht with toilet system circuit breaker on.

4. NEVER use drain openers, alcohol, solvents, etc. in the system.

5. If the system does not function properly, refer to the Troubleshooting Section of this manual and repair as necessary. If problem persists, contact your dealer.

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NORMAL OPERATION

1. To add water to the toilet before using, raise flush lever until desired water level is reached. Generally more water is required only when flushing solids.

2. To flush toilet, press flush lever sharply down to the floor until contents clear bowl. A sharp popping noise is normal when the vacuum seal is broken and flushing action begins. Be sure to hold lever down for three (3) seconds. If flush lever is accidentally released before waste clears bowl, DO NOT attempt to flush toilet again until vacuum pump stops running. A small amount of water should remain in the bowl after flushing.

3. DO NOT dispose of sanitary napkins or other non-dissolving items in toilet, such as facial tissue or paper towels. These items can cause plugging of the system.

COMPONENTS

Vacuum Generator

The vacuum generator combines the vacuum tank and vacuum pump in one unit. It greatly reduces installation time and eliminates the hose run between the tank and pump. Its compact size makes it especially well suited for your yacht.

TankWatch® Level Indicator

The TankWatch® unit utilizes micro-float switches which activate a three light panel. The inspection cap in the holding tank contains the micro-float switch units. The adjustable probe assemblies are flexible polyethylene tubing and are designed to flex when tank contents move. One adjustable probe in the three-light system is set to sense when the tank is empty.

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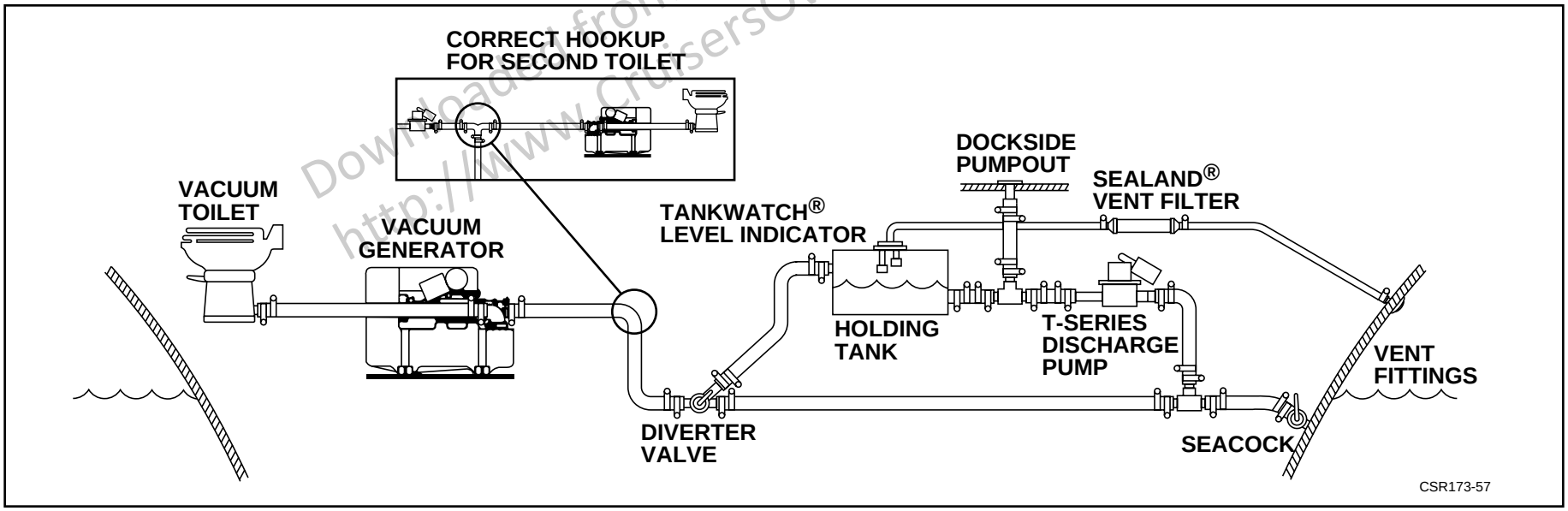

BILGE SYSTEM

IMPORTANT

The discharge of oil or oily waste into or upon the navigable waters of the United States or of the contiguous zones is strictly prohibited by the Federal Water Pollution Control Act. If such a discharge occurs and causes a film or sheen upon, or discoloration of the surface of the water, or causes an emulsion or sludge beneath the surface of the water, the violators are subject to a penalty of $5,000. Notify the Coast Guard immediately or call toll-free 1-800-424-8802 to report any such incident.

The deep part of the hull, where incidental water drains, is called the bilge. Water will enter the boat for a number of reasons but entry will be particularly heavy during periods of long rains, heavy storms and high seas. The water that enters is pumped overboard by the bilge pumps. The bilge is vented through the hull and bilge blowers are used to speed up the evacuation of fumes from the engine compartment.

Pumps

Three pumps, one located in front of the forward steps, one located in the engine compartment and one under the aft shelf in the master stateroom, are used to remove the bilge water.

CAUTION

Do not rely upon electric equipment to operate trouble-free. Frequent inspection of the bilge to make sure the pumps are operating properly is a necessity.

The pumps can be operated manually from the keypad, or left in the automatic mode.

CAUTION

Do not allow pump to run after all the water has been cleared from the bilge area. Damage to the pump will occur if the pump is allowed to operate with no water.

Circuit breakers for the automatic bilge pump power are located on a panel in the engine room. This feature allows bilge pumps operation when the master battery switch is turned “OFF.” When water in the bilge reaches a certain level, a triggering device turns the pump on. When the water drains, the pump will automatically shut off.

Power is supplied to AUTO BILGE PUMPS by the house battery. The MANUAL BILGE PUMP controls at the keypad will bypass the auto feature, allowing the option of controlling the pumps manually. Turning the bilge pumps off at the keypad will return the bilge pumps to automatic operation.

Blowers

WARNING

- **Fuel vapors can explode!**
- **Before starting engines, check engine compartment for the presence of fuel vapors.**
- **Operate the blowers for at least four minutes before starting the engines.**
- **Turn the blowers on when idling or operating below cruising speed.**

The 455 Series Boats are equipped with 12 volt DC powered bilge blowers which provide ventilation for the engine compartment. The blowers are controlled from the keypad at the dash panel.

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Section 5 – Getting Underway

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SAFE BOATING

Safety Checks

Safe boating is one of the requirements for pleasant boating! Use common sense and safe practices while enjoying your boat. Use the following safety checks; you are responsible for the safety of your passengers as well as others in and on the water.

- Keep your boat and equipment in good condition; inspect the hull, engines, power train and all gear frequently.
- Use care when fueling boat. Fuel in the bilge is extremely dangerous! Make sure there are no fumes in your boat before starting the engine.
- Know your fuel tank capacity and engines' fuel consumption. Be sure you have enough fuel to reach your destination with adequate reserve for course changes due to weather or other problems.
- Regularly check all safety equipment such as fire extinguishers, life preservers, flares, horn, etc. They should be in good condition, readily visible and easily accessed.
- Keep up-to-date navigational charts onboard of areas to be traveled.
- Make a practice of letting someone know your travel plans and route; leave a float plan with someone.
- Check local weather reports before casting off. Watch the weather! Be on the lookout for strong winds and electrical storms.
- Do not overload or improperly load your boat.
- Require good boat shoes be worn by all passengers to avoid slipping.
- Passengers should be instructed how to use all safety equipment. Each person must have a life preserver. Children and non-swimmers should wear life preservers at all times.
- Don't allow passengers to ride on parts of the boat not designed for that use. Do not store equipment or climb on the radar arch or optional hardtop.
- Instruct at least one passenger in the basics of operation and handling of your boat in case you are disabled or fall overboard.
- DO NOT use the swim platform or boarding ladder while the engines are running. Turn engine off when swimmers or skiers are getting in or out of the water.
- Obey all navigational rules!
- If uncertain of water depth, proceed slowly and with caution!
- Hydraulic swim platform must be all the way up before getting underway.
- Hydraulic Swim Platform can support 650 lbs safely.
- A small loss in performance may be experienced when a tender is placed on the swim platform. This change in performance will vary due to engine package, options, as well as fuel and water load.
- It may be necessary to reprop the boat to correct some of the performance issues.

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Sample Float Plan

Copy this page and fill out the copy before going boating. Leave the filled out copy with a reliable person who can be depended upon to notify the Coast Guard or other rescue organization, should you not return as scheduled. DO NOT file this plan with the Coast Guard.

Name _____ Telephone _____

Description of Boat: Type _____ Color _____ Trim _____

Registration Number _____

Length _____ Name _____ Make _____

Other Info. _____

Persons Aboard: Name Age Address & Telephone

_____ _____ _____

_____ _____ _____

_____ _____ _____

_____

Engine Type: _____ HP _____

No. of Engines: _____ Fuel Capacity: _____

Radio: Yes _____ No _____ Type _____ Freq _____

Trip Expectations: Departure Time _____ Leaving From _____

Destination _____ Est. Time of Arrival _____

Expect to Return By _____

Auto Type _____ License No. _____ Parked _____

If not returned by _____ call the Coast Guard, or _____

(Local Authority). Coast Guard Telephone Number: _____

Local Authority Telephone Number: _____

Survival Equipment:

PFD's _____

Flares _____

Mirror _____

Smoke Signals _____

Flashlight _____

Food _____

Paddle _____

Water _____

Anchor _____

Raft or Dinghy _____

EPIRB _____

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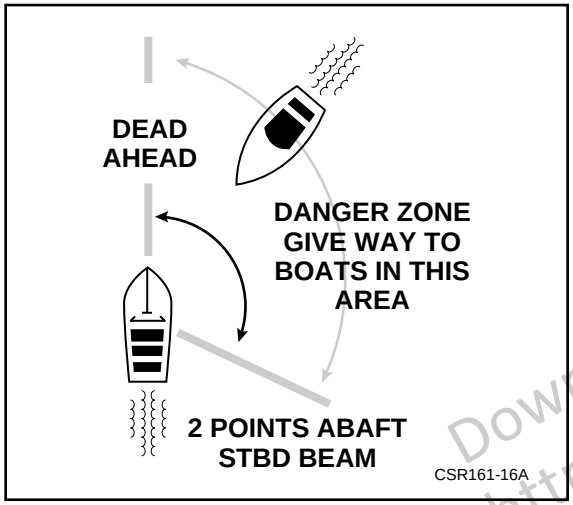
Boating Rules and Regulations

BASIC RULES FOR SAFE BOATING

- Your boat must be registered and licensed in the state of principle use.
- Give right of way to slower boats, rowboats and sailing craft.
- Keep to the right! Observe the Danger Zone and give right of way to boats in this zone.



- Do not use your motors near swimmers or divers.
- Learn the language of the various buoys and warning signals.

GOVERNMENT REGULATIONS

The Coast Guard is the authority of the waterways; they are there to help the boating public. You and your boat are subject to marine traffic laws and “Rules of the Road” that are enforced by the Coast Guard.

There are many pamphlets prepared by the Coast Guard available to you. These pamphlets explain “Rules of the Road”, signal lights, buoys, safety, international and inland regulations and more than is discussed here. For more information contact your local U. S. Coast Guard unit. U. S. Coast Guard Headquarters, 1300 E Street NW, Washington, D.C. 20226 or call the Coast Guard Boating Safety Hotline at 1-800-368-5647.

There are also many boating safety courses available to the public. Call toll-free “Courseline” 1-800-336-2628 to find out what courses are offered in your area.

The minimum standards of safety as required by the U. S. Coast Guard for your boat are listed below. You MUST equip your boat to meet or exceed these requirements.

- At least one (1) Coast Guard approved, Type I, II or III, personal flotation device (life jacket) for each person aboard. If you are more than 20 miles offshore, you must have Type I.
- At least one (1) Coast Guard approved, Type IV, throwable flotation device - ring or cushion.
- At least four (4) Type B-I or one Type B-II hand-held fire extinguishers.
- At least three (3) Coast Guard approved, hand-held red pyrotechnic (flare-type) distress signals:
  Night Use - three (3) aerial red pyrotechnic distress signals
  Day Use - three (3) international orange smoke signals
- All pyrotechnic devices must be stowed in waterproof, non-glass containers.
- One (1) hand, mouth or power operated whistle or horn that can be heard for at least one-half mile.
- Must be fitted with a bell or whistle to comply with 72 COLREGS (not supplied by manufacturer).
- Must also have on board a copy of 72 COLREGS.

The Coast Guard also recommends you carry an anchor, anchor line, mooring lines, fenders, first aid kit, waterproof flashlight, spare fuses, electrical tape and tool kit.

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Signals and Rules of the Road

- Learn and observe the United States Weather signals. Red and black flags are used by day and red and white lights are used at night.

  Small Craft Warning
  Forecast is for winds up to 38 mph (34 knots) and/or sea conditions dangerous to small craft.

  Gale Warning
  Forecast is for winds from 39 to 54 miles an hour (34 to 48 knots).

  Whole Gale Warning
  Forecast is for winds from 55 to 73 miles an hour (48 to 63 knots).

  Hurricane Warning
  Forecast is for winds in excess of 74 miles an hour (64 knots).

- Obey marker flags.
  A red flag with a diagonal white stripe, or the “A” flag, indicates a skin diver in the area.

- A solid orange flag with a black square atop a black ball indicates distress. Either the boat or a passenger is in serious trouble.

- Recognize the different buoys; they are the waterway road markers. There are three types of buoys:

  NUN - Cone shape
  SPHERE - Spherical shape
  CAN - Cylindrical shape

When entering port or going upstream, the PORT (left) side of the channel is marked with GREEN, ODD numbered can buoys. The STARBOARD (right) side of the channel is marked with RED, EVEN numbered nun or spar buoys.

The middle of the channel is marked with RED and WHITE vertically striped spherical or can buoys; always pass close to the buoys. Can buoys will have a spherical topmark.

Obstructions, channel junctions, etc. are marked with RED and GREEN horizontally striped buoys. A RED band at the top means the preferred channel is to the left of the buoy; a GREEN band means the preferred channel is to the right of the buoy. These buoys are sometimes lettered but never numbered.

Lights, bells and horns are used on buoys for night or poor visibility conditions.

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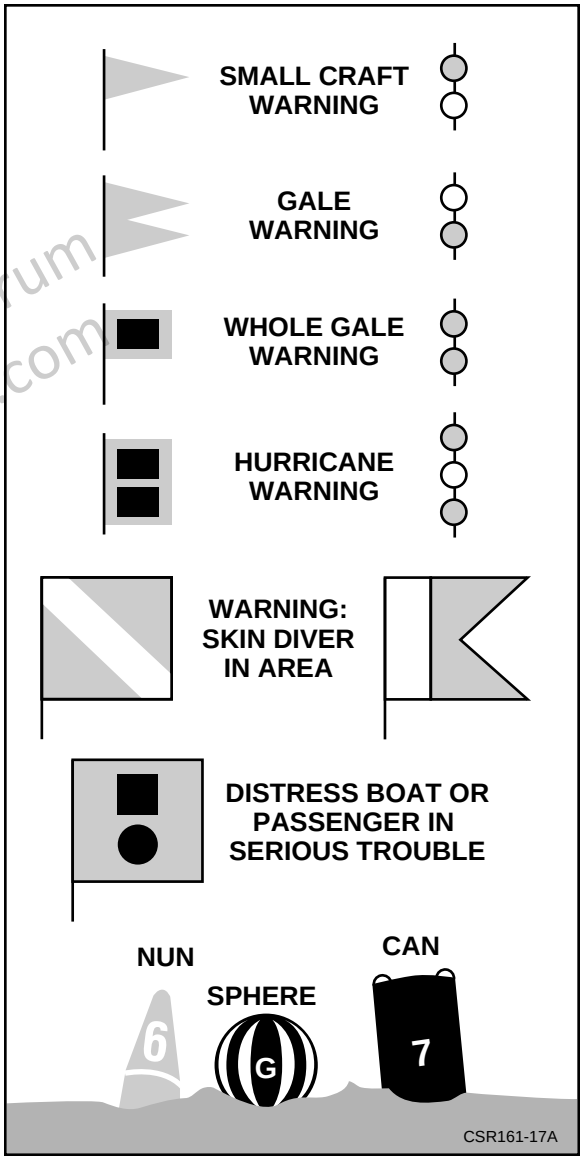

- Know whistle signals!

  One Long Blast: Warning Signal (Coming out of slip)
  One Short Blast: Pass on my port side
  Two Short Blasts: Pass on my starboard side
  Three Short Blasts: Engines in reverse
  Four or More Blasts: Danger Signal

- If there is a ship-to-shore radio telephone aboard, answer any distress calls. “MAYDAY” is the international signal of distress. NEVER use this word unless there is an emergency and assistance is needed immediately.

DISCHARGE OF OIL

The discharge of oil or oily waste into or upon navigable waters of the United States or of the contiguous zones is strictly prohibited by the Federal Water Pollution Control Act. If such a discharge occurs and causes a film or sheen upon or discoloration of the surface of the water, or causes an emulsion or sludge beneath the surface of the water, the violators are subject to a penalty of $5,000. Notify the Coast Guard immediately or call toll-free 1-800-424-8802 to report any such incident.

Safety Precautions for Engine Exhaust

WARNING

Do NOT inhale exhaust fumes! Exhaust contains carbon monoxide. Carbon monoxide is colorless, odorless and potentially lethal.

The carbon monoxide present in exhaust fumes can be extremely hazardous. Direct, prolonged exposure will cause brain damage or death. Incoherence, drowsiness, loss of consciousness, headaches, nausea and vomiting are some symptoms of exposure to carbon monoxide.

If you think exhaust fumes are entering your boat, correct the problem immediately. Observe the following safety precautions:

- Be alert for the odor of exhaust fumes.
- A natural vacuum created while underway in certain wind and sea conditions may allow exhaust to be drawn into the cabin. Adjust the direction of the boat while underway as necessary to alleviate the presence of exhaust fumes.
- Do not allow the boat to remain stationary with the engine running for any extended period.
- Use care when operating engines or generator in confined areas. Exhaust fumes can enter the boat even with all windows, doors and hatches closed.
- Never operate the generator or leave the engine running if the exhaust port is obstructed.
- NEVER run the engines or generator while everyone onboard is sleeping. If a person is sleeping, be sure adequate fresh air ventilation is provided.
- If your boat is equipped with a forward hatch or windshield side vents, OPEN THEM while underway.
- If you choose to be underway with canvas up, you must vent the forward area to clear the cockpit of fumes.
- Inspect the engine exhaust system frequently for tightness of clamps and hoses. If you notice a change in engine sound, check all exhaust connections.

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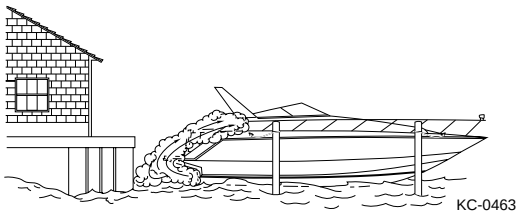
⚠ *DANGER* ⚠
EXTREME HAZARD

Carbon monoxide gas (CO) is colorless, odorless and extremely dangerous. All engines and fuel burning appliances produce CO as exhaust. Direct and prolonged exposure to CO will cause BRAIN DAMAGE or DEATH. Signs of exposure to CO include nausea, dizziness and drowsiness. Sources of CO include the examples to the right:

To reduce CO accumulation, ventilate the boat interior by opening the windows and/or canvas to provide adequate ventilation. Deck hatches can be opened at slow speed or while dead in the water, but must be closed at or above planing speeds to prevent damage and possible personal injury.

ENSURE ADEQUATE VENTILATION FOR CORRECT AIR MOVEMENT THROUGH BOAT!

❶ Blockage of boat exhausts by obstruction.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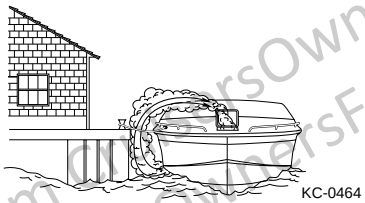
❷ Exhausts traveling along obstruction.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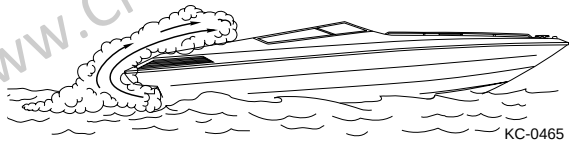
❸ Operating at slow speed or while dead in the water.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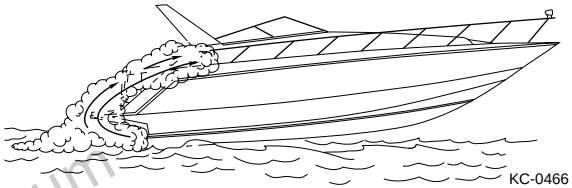
❹ Operating with high bow angle.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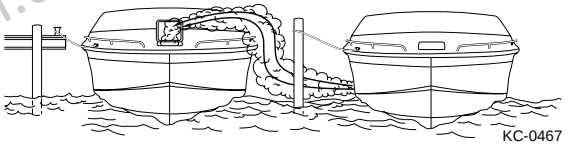
❺ Exhausts from other vessels in confined areas.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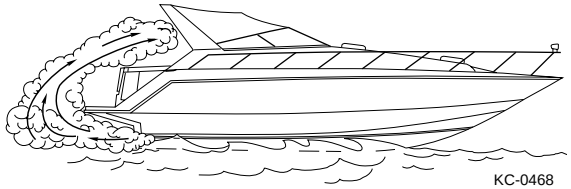
❻ Operating with canvas tops and side curtains in place without ventilation.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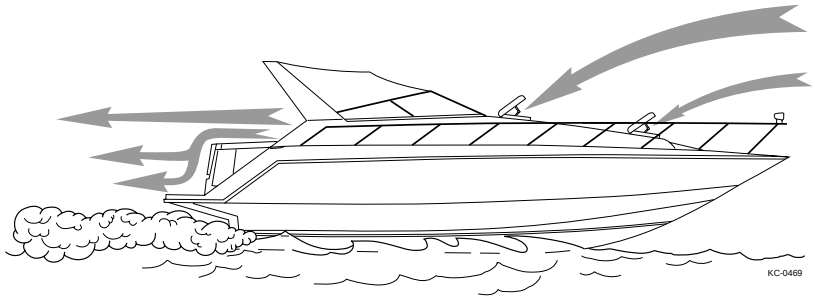
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OPERATING INSTRUCTIONS

Pre-Start Checklist

Before starting the engine, perform the following checks and procedures:

- See Section 6, PERIODIC CHECKS AND SERVICES, before every use.
- Your craft should be securely moored to the dock or slip. The boat should remain moored until the engine is warmed up and properly running.
- Check weather conditions and forecasts.
- Check all life saving devices. Make sure there is one life jacket for each person aboard.
- Check capacity rating plate. Do not leave the dock with an over loaded craft!
- Open windows, doors and engine hatch. Check for fuel fumes and water in the bilge area.
- Place master battery switch on the DC panel in the “ON” position.
- Operate the bilge blowers for at least four minutes before starting the engine. Allow the blowers to run until cruising speed is attained.
- Check engine and transmission oil levels. If equipped, check fresh water coolant level.
- Check diesel fuel valves to make sure fuel can flow to engines.
- Open seacock(s) for engine cooling water, head flush water, air conditioning water, etc., as equipped.
- Check all intake water strainers.
- Check steering control, throttle and shift control linkage. Look for hydraulic leaks. Make sure all connecting hardware is tight.
- Check battery charge.
- Check fuel supply.

IMPORTANT

DO NOT rely on the accuracy of gauges. Readings are only approximate and should always be compared to the hours of use multiplied by the known fuel consumption (GPH).

- Check all electrical components such as the horn, lights and bilge pump to be sure they are in proper working order.
- Make sure shift control lever is in the NEUTRAL position.

Starting Diesel Engines

After pre-start checks and procedures have been followed the engines can be started. Follow the step-by-step instructions below and be sure to read the engine owner’s manual for manufacturer’s recommendations.

WARNING

Always start engines with shift control levers in neutral. Your boat is equipped with neutral safety switches which will not allow engines to be started unless shift control levers are in the neutral position.

1. With ignition key switches off, put both shift control levers in neutral position.
2. Move throttle lever of engine to be started to approximately one-half throttle position.
3. Push toggle switch of engine to START position. Release button immediately after engine starts. The button is spring loaded and will return to the RUN position.

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CAUTION

Failure to release ignition button after engine starts may damage the starter motor and drive.

Do not operate starter continuously for more than 30 seconds. Allow starter to cool at least 2 minutes between starting attempts.

4. Operate the engine at approximately 1400 RPM and check the oil pressure gauge. If oil pressure does not rise to specified range in 15 seconds, STOP ENGINE IMMEDIATELY and determine the cause.

5. Repeat starting procedure for the second engine.

IMPORTANT

The second engine may be difficult to hear when it starts due to the noise of the first engine. Observe the tachometer of the second engine. When the RPMs "jump up." release the key switch immediately.

6. Allow engines to warm up. Check water temperature gauges to be sure water temperature remains within the specified range. If temperature gauge reads abnormally high, STOP ENGINE IMMEDIATELY and determine the cause.

7. Check engine exhausts to see that they are discharging water. Water circulation in the engines should take place shortly after starting.

8. Inspect for any fuel, oil, water and exhaust leaks.

Stopping Diesel Engines

1. Move throttle control levers to idle position.

2. Put shift control levers in neutral position.

3. Move throttle control levers forward until engine RPM is no more than 1400 RPM. Operate engines for 5 minutes at this speed to cool engines.

4. After cooling engines, move throttle control levers back to idle position.

5. Push fuel/engine shutdown buttons until engine rotation stops.

6. Turn key switches counterclockwise to OFF position.

Fueling

Refer to your engine owner's manual for the fuel type recommended for your particular engine. Your dealer may have fuel suggestions relative to climate conditions and the use of your boat.

WARNING

All precautions must be taken every time you fuel your boat. Diesel fuel is non-explosive but it will burn!

Use the following precautions before fueling to avoid fire and explosion:

- Make sure your boat is securely moored to the dock.
- Stop engines, fans, galley fire and any other device that can produce a spark or flame.
- Close all windows, doors and hatches to keep fumes from entering the boat.
- Disembark all people not needed for fueling the boat.
- Prohibit all smoking in the area.
- Locate the nearest fire extinguisher for use if needed.

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While fueling, keep the fill nozzle in contact with fill opening of the tank to protect against any static sparks or spilling fuel.

Do not fill the tank until fuel flows from the vents. Allow room in the tank for fuel expansion.

When tank is full, close fuel opening and clean up any spilled fuel. Wash the areas around the fuel caps and vents. Dispose of rags properly on shore.

IMPORTANT

Spilled fuel may yellow the fiberglass gel coat and damage accent tapes.

Open all windows, doors and hatches. Operate the bilge blowers for at least four minutes. Fuel fumes are heavier than air and will sink to the lowest part of the boat.

Before starting the engines, check for any fumes or leaks in the bilge. Ventilate the boat until the fumes are no longer present. Repair any leaks immediately.

Suggested Maneuvering Techniques

GENERAL GUIDELINES FOR MANEUVERING

- Practice Makes Perfect! Start in calm water with no wind and lots of room until you get the feel for the boat and its controls.
- Forget the Steering Wheel! The rudders are basically useless at slow speeds. Put your hands on the control levers and leave the steering wheel alone.
- Recognize the Outside Forces! Check the wind direction and velocity, as well as the water currents. Use the external forces to your advantage when maneuvering; don't fight them.
- Proceed Slowly! Give yourself time to think, react and maneuver.
- Have the Crew Standing By! Hands ready with fenders, boat hook and lines can assist greatly as you approach a dock.

GRADUAL TURNS AT LOW SPEED

WARNING

High speed, full range turns are not recommended. The quick response of the hydraulic steering system and the high speed, may cause people and objects to be thrown around inside or even over-board. Exercise prudence in the way your boat is handled!

A gradual turn while moving at low speed, forward or reverse directions, is best accomplished by varying propeller speed. Straight line movement is maintained with the counterrotating propellers turning at the same speed. Increasing the speed of one prop and maintaining or reducing the speed of the other prop will turn the boat towards the slower prop.

The optional bow thruster can be used to maneuver the bow to port or starboard.

WARNING

Rudders have little or no steering control at low speeds or when moving in reverse. This apparent "loss" of steering can cause confusion, even panic, among novice skippers. Practice maneuvering BEFORE you attempt any complex moves. Know your boat!

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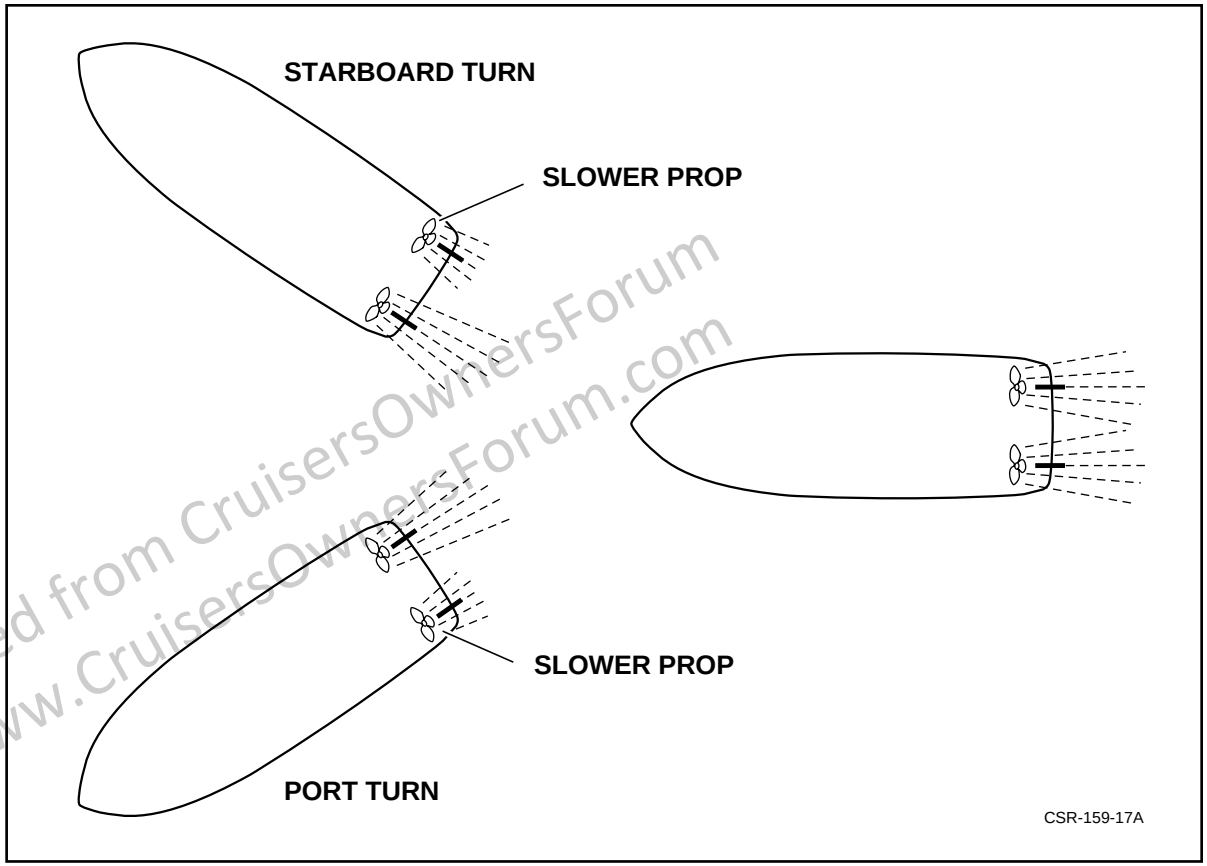
Remember when turning astern (in reverse), the bow will make a much wider arc than the stern. Be on the alert to avoid possible collisions in crowded areas.

HOLDING POSITION

CAUTION

Do not shift transmission at engine speeds above 1000 RPM. Damage to engines or power train could result. Momentarily pause in neutral and allow engine to return to idle speed before engaging transmission.

Using throttle and shift control levers to compensate for wind and water currents allows you to maintain a relatively still position in the water. Keep the bow pointed into the wind or current, if possible, by using the gradual turning procedure above. Slow and equal speeds on both props will allow you to maintain position with minor throttle adjustments for any correction. Compensate for slight wind and water current by individually adjusting throttle levers and moving shift levers between forward and neutral.



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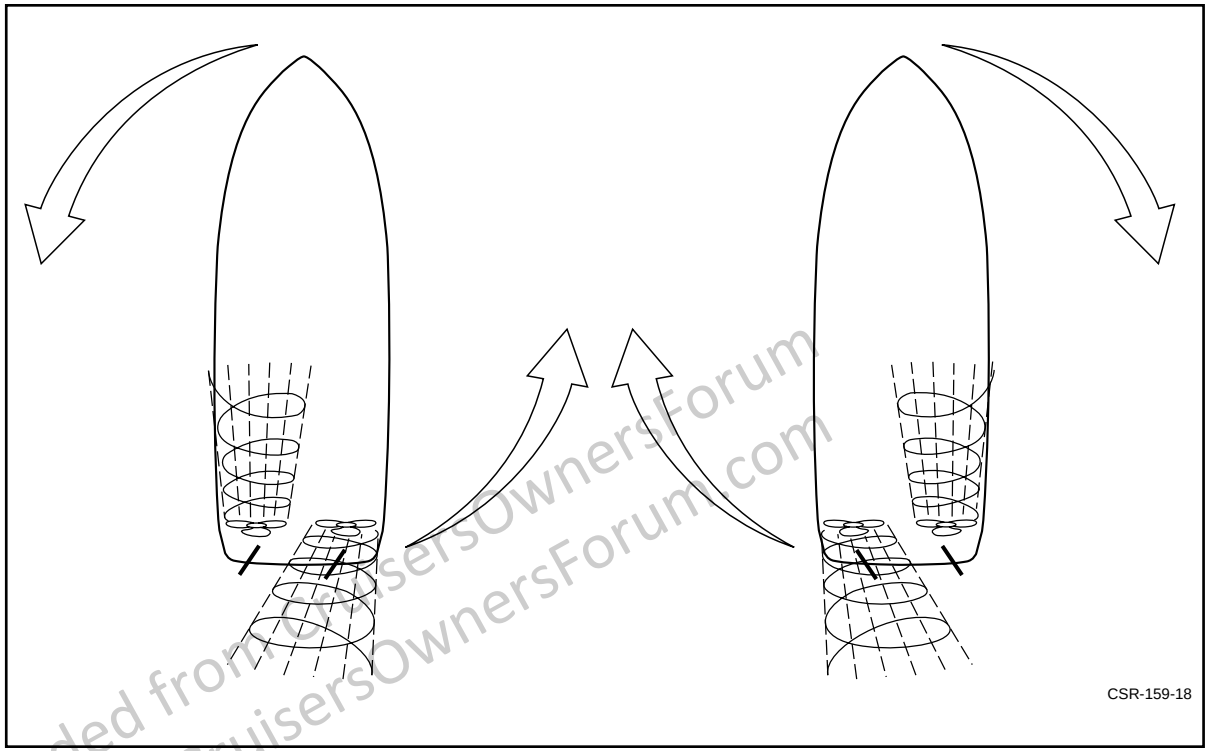
SHARP AND CLOSE QUARTERS TURNS

A sharp turn can be achieved by putting one shift lever in forward position and the other in reverse position. The rate of the turn can be controlled by the rudder as well as engine speed. Turning the steering wheel in the direction of the turn will increase the rate of turn.

Close quarters or “on-a-dime” turns can be used to change direction in small areas.

From the hold position procedure, move the shift levers: one to reverse, the other to forward. To advance your position and quicken the turn, increase the speed on the forward prop. To move back from your position and quicken the turn, increase the speed on the reverse prop. The optional bow thruster can be used to maneuver the bow to port or starboard.



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PROPELLER “BURSTS” AND STOPPING

Propeller burst is a maneuvering technique requiring fairly moderate speed (800-1000 RPM) and using shift controls only. Move shift lever of port or starboard engine to forward or reverse for short intervals to maneuver the boat into the desired position.

Stopping the boat’s forward movement (checking headway) using propeller bursts will reduce the distance required to stop. With engine speeds equal, move both shift levers to reverse to slow or stop forward movement.

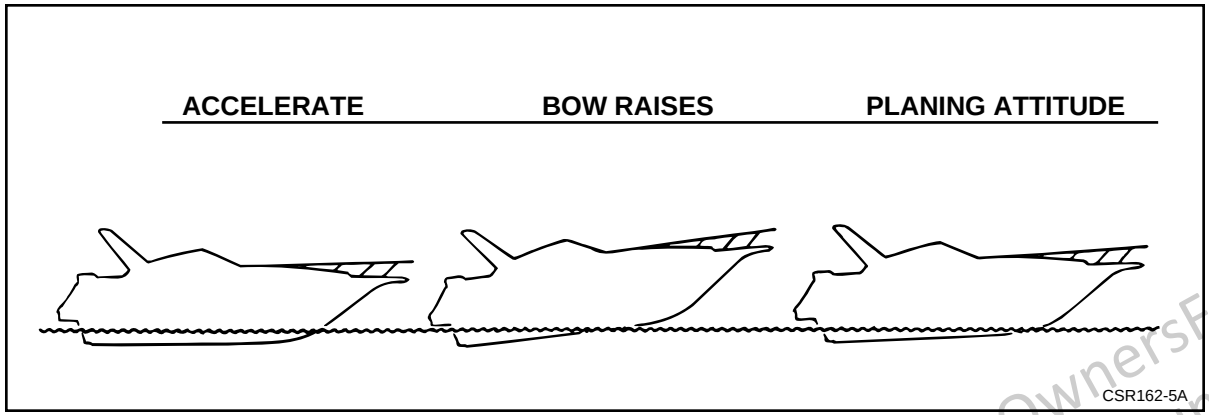
TRIMMING THE BOAT

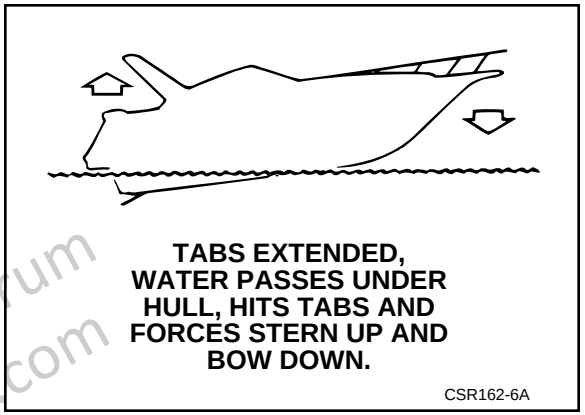
When the boat is accelerated forward, its trim angle increases causing the bow to ride high and the stern low. Continued acceleration will bring the trim angle to a maximum angle (“hump”); then the boat will level out to its planing attitude.

It is important to get “over the hump” as soon as possible due to the reduced visibility, handling and performance. A few seconds at full throttle should get the boat over the hump and into a planing attitude. Once you are “over the hump” and at a comfortable plane, move the throttle control back to 2/3 to 3/4 throttle, a more fuel efficient cruising speed.

⚠ WARNING

Do not overtrim. The boat may veer or the bow may dig in causing you to lose control.





When accelerating to cruising speed, lower trim tabs to assist the boat up at the stern and into a planing attitude quickly. As water passes under the hull, it contacts the trim tabs forcing the stern up. Change the angle of the trim tabs to change the rate of lift; lower tabs result in faster lift.

Until you become familiar with trimming your boat, move the rocker switches in half-second intervals. The boat will not react immediately; it will take a few seconds.

Trim tabs can also be used to control uneven weight situations while underway. For a heavy stern, lower trim tabs equally until a comfortable plane is achieved. If the port or starboard is heavy, lower the trim tab on the heavy side to a point where the boat levels out.

Dropping and Weighing Anchor

Maneuver the boat over the spot where the anchor is to be lowered, keeping in mind the wind, current and scope (length of the anchor line). A good gauge for the amount of scope is a length 6 to 7 times the depth of the water anchored in. For example, you are in 10 feet of water, so use approximately 60 to 70 feet scope.

Have a crew member on the bow carefully lower the anchor. When the anchor is on the bottom, keep slight tension on the line. Maneuver the boat backwards slowly until the proper scope has been fed out. Fasten the line around the bow cleat. Anchor flukes should dig in and hold.

Watch for anchor drag by observing shoreline landmarks at the time the anchor is dropped and one-half hour later. If the reference marks have moved, the anchor is dragging and must be reset.

The end of the anchor line should be attached to a mooring cleat. When the line is coiled, it should be done neatly and each coil put around or on top of the previous coil so the line can be fed out smoothly when anchoring.

To weigh (pull in) anchor, it is recommended to have the engines running. Pull in the scope until the line is vertical. Pull hard to lift the anchor's shank and free the flukes from the bottom material.

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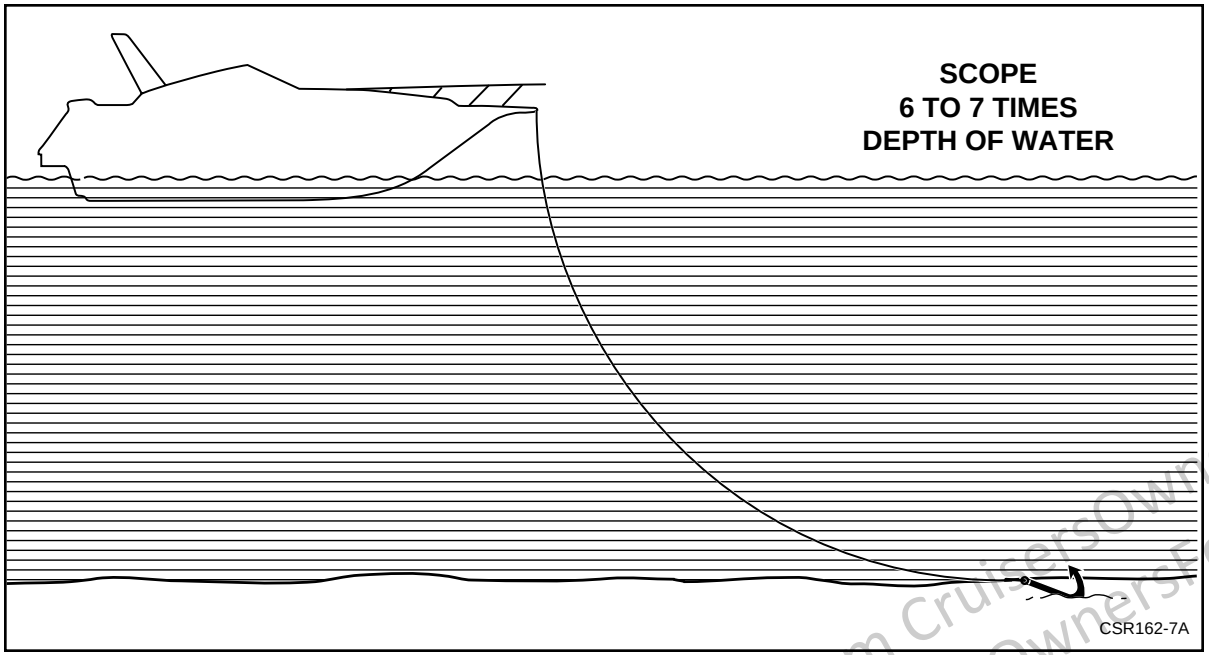

If the anchor is stuck, attach the vertical, taut line to the bow cleat. Wave action on the bow may lift flukes from the bottom. If the anchor is still stuck, feed out a few feet of line and attach it to bow cleat. Maneuver the boat around the anchor, keeping the line tight. Find an angle that will pull the anchor loose.

If your boat is equipped with a windlass, use the same procedures as above but refer to the manufacturer's instructions on the operation of the windlass. Always remember to relieve the load on the windlass when anchored: use a bridle attached to a cleat or attach the line directly to a cleat.

Towing the Boat

CAUTION

Do not use deck hardware for grounding and towing! The stress may be too much for cleats and mounting plates. Cleats are designed for mooring use only.

If you are aground, need a tow or wish to tow another craft, use great care. The boat structure can be damaged by excessive pulling strain.

Use a double-braided nylon rope. Some synthetic fiber ropes stretch too much. Make a bridle for each craft (towing and towed) by putting a rope completely around the hull.

WARNING

Always stay clear of any tight or stretched lines.

If you run aground, depending on the situation, there are a few things you can do.

- Wait for the rising tide to lift you off.
- Shift weight and passengers to heel of the boat. Reverse the props to back-off.
- Use another boat to carry the anchor to deeper water. Operate the windlass to pull the boat free.
- If all efforts fail, get help from the Coast Guard.

IMPORTANT

You should always offer help to a craft in distress. However, towing a capsized boat, grounded boat or hull-damaged boat is dangerous. Give assistance to the occupants, then call the proper authorities.

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Section 6 – Periodic Checks and Services

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PERIODIC CHECKS AND SERVICES

The checks and services outlined in this section are to be accomplished in conjunction with the periodic maintenance outlined in the various owner's manuals contained in the Skipper's Kit. It is extremely important that you read and understand the periodic maintenance tasks outlined in your owner's manuals (such as the engine owner's manual and the generator owner's manual), because those maintenance tasks are not repeated in this manual.

Use the adjacent table to establish your maintenance routine. The pages which follow provide instructions on how to accomplish each of the required checks and services listed.

FREQUENCY	TASK
Before Every Use	1. Check seawater strainers for leaks and accumulation of debris. 2. Check exhaust system for leaks. 3. Check seacocks for leaks. 4. Check propeller shaft logs for water entry. 5. Check fuel system lines and connections for leaks. 6. Check battery charge.
Every 50 Hours	1. Clean seawater strainers. 2. Clean freshwater filter. 3. Inspect rudder tie bar. 4. Check rudder shaft logs for leaks. 5. Inspect propellers for damage.
Every 100 Hours	1. Inspect freshwater system for leaks. 2. Clean bilge.
Monthly	1. Lubricate air horn compressor. 2. Test GFCI outlet. 3. Check zincs. 4. Check all hose clamps on propeller shaft logs. 5. Check all shift and throttle cable connections at controls, engines and transmissions.
Quarterly	1. Check battery electrolyte level. 2. Check hydraulic steering system oil level.
Annually	1. Check trim tab pump fluid level. 2. Check engine to shaft coupling alignment. 3. Lubricate rudder shaft. 4. Lubricate seacocks. 5. Check engine mounting hardware.

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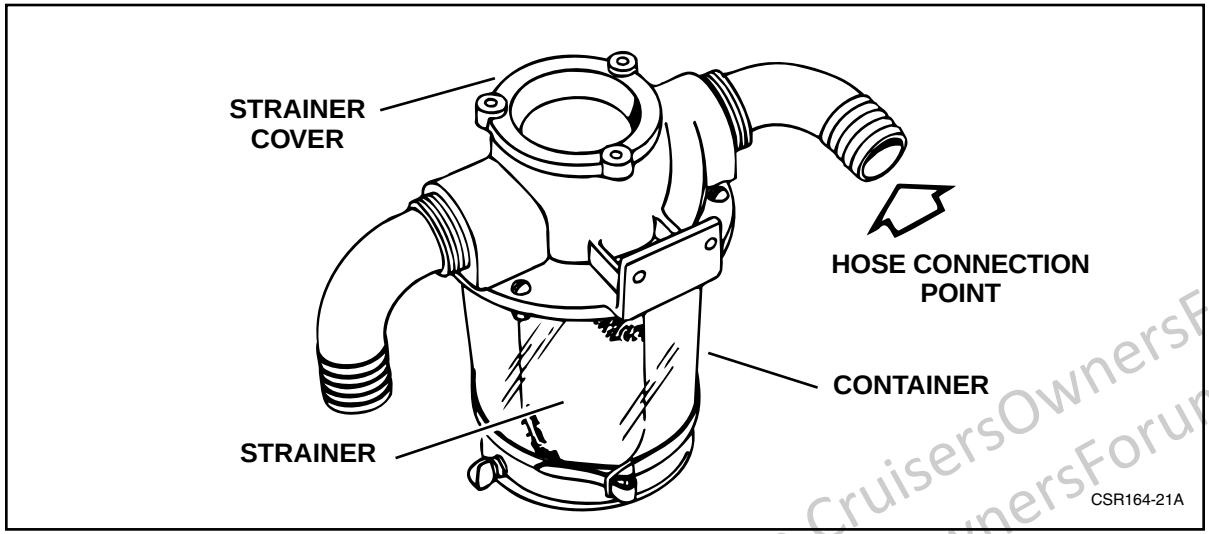
Before Every Use



CHECK SEAWATER STRAINERS FOR LEAKS AND ACCUMULATION OF DEBRIS

1. Check the following stainers:

   Port and starboard engine cooling water strainers located in engine compartment.

   Generator cooling water strainer located in engine compartment.

   Air conditioning seawater strainer located in the engine compartment.

   Cockpit washdown strainer located at the transom on the port side.

2. Inspect all hose connections to and from the strainers for leakage.

3. If hose is damaged or leaking, close the appropriate seacock to prevent any further entry of water and then replace the damaged hose and clamps. See your authorized Cruisers Yachts dealer for parts and service.

4. Inspect container for build-up of debris which can clog the strainer and cause a system failure. If strainer needs to be cleaned, do the following:

   a. Close appropriate seacock.

   b. Remove strainer cover. Some covers can be removed by simply loosening a wing nut and swinging the cover to the side; others need to be unfastened using an allen tool.

   c. Lift strainer from container and use a stiff brush to clean. Rinse with clean water and return to container.

   d. Fasten cover to container and remember to open seacock before operating.

CHECK EXHAUST SYSTEM FOR LEAKS

1. Start the engines following the normal start procedure.

2. Check hose connections from engines and generator for leakage.

3. If leakage is apparent, tighten hose clamps. If leakage persists, replace hoses and clamps. See your Cruisers Yachts dealer for parts and service.

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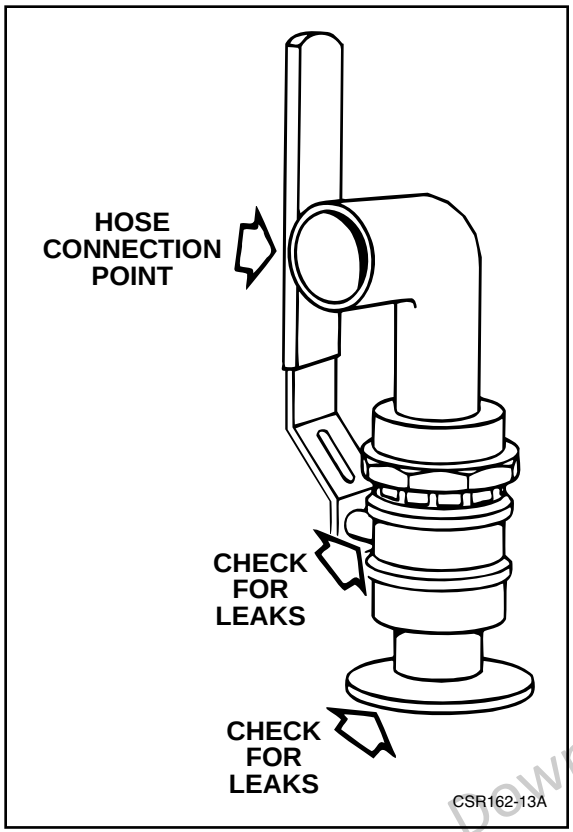
CHECK SEACOCKS FOR LEAKS



1. Check the following seacocks:

   Port and starboard engine cooling water seacocks located in the engine compartment.

   Generator cooling water seacock located in the engine compartment.
   Air conditioning seacock located in the engine compartment.

   Head outlet seacocks located in the port generator compartment and in the port engine compartment.

2. Inspect hose connections at seacock for leaks.

CAUTION

When replacing hoses, make sure that the appropriate seacocks are closed.

If hose is leaking, tighten hose clamp. If hose is damaged, replace the hose and clamps. See your Cruisers Yachts dealer for parts and service.

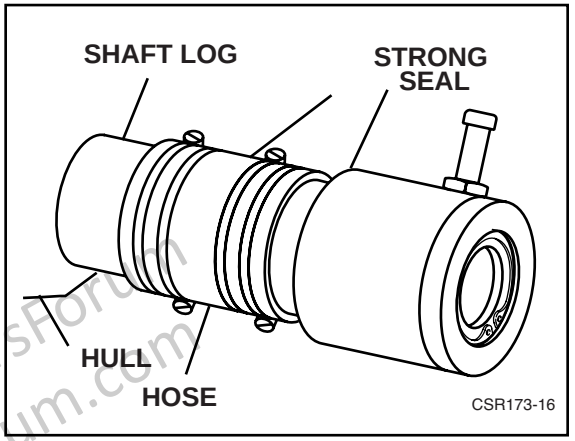
3. Inspect seacocks for signs of leakage at base and handle.

CAUTION

Seacocks can only be replaced when the boat is out of the water.

If leakage is apparent, take your boat to a Cruisers Yachts dealer for immediate service.

CHECK PROPELLER SHAFT LOG FOR WATER ENTRY



1. Operate boat at cruising speed.

2. Inspect propeller shaft at shaft log. This is a “dripless” shaft log, so no water entry is permitted.

CAUTION

Cruisers Yachts will not warrant damage incurred due to an improperly adjusted or neglected shaft log. Excessive water entry could result in the submergence of the engine compartment.

3. If water entry is apparent, adjust shaft log.

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CAUTION

Always hand tighten the shaft log hose clamps. Tightening clamps too tight will damage the packing material and the shaft, ultimately leading to system failure.

4. Check the rubber coupling, it should be watertight. If leakage is apparent, tighten hose clamps. If hose is damaged, or the leak persists, refer the problem to your Cruisers Yachts dealer.

CHECK FUEL SYSTEM LINES AND CONNECTIONS FOR LEAKS

1. Check all lines and connections at the fuel tanks, and at the generator and engines.

WARNING

DO NOT operate the engines when fuel leaks have been detected. All fuels are combustible. Repair any leak before starting the engine or the generator.

2. Tighten any connection that may be leaking. If problem persists, or fuel lines are damaged, refer the problem to your Cruisers Yachts dealer.

CHECK BATTERY CHARGE

1. Turn MASTER BATTERY switch on.
2. Move the battery test switch to “1” to check the starboard engine cranking battery, and to “2” to check the port engine cranking battery.
3. Move the test switch to “3” to check on the auxiliary batteries.
4. When you have checked all the batteries, turn the test switch to the “OFF” position.

Every 50 Hours

CLEAN SEAWATER STRAINERS

Refer to “Check Strainers” in “Before Every Use.”

CLEAN FRESHWATER FILTER

IMPORTANT

Freshwater system must be completely drained before attempting to service filter.

1. Grab filter housing at bottom and unscrew from cover.
2. Remove screen from housing and flush with clean water. Use a brush to remove any sediment.
3. Return screen to housing bottom and reattach bottom to housing cover.

INSPECT RUDDER TIE BAR

1. Check tie bar at each end for loose hardware and damaged or missing cotter pins. Tighten and replace as needed.
2. Check cylinder where it attaches to tie bar for loose hardware. Tighten as needed.
3. Check connecting arm at rudder shaft for looseness. Tighten as needed.
4. Check rudder shaft setscrew for looseness or damage. Tighten or replace as needed.
5. Check hydraulic lines for leaks.

CHECK RUDDER DRIPLESS COLLARS FOR LEAKS

1. Check rudder shaft at shaft log for signs of leakage. Turn the steering wheel to actuate the rudder hydraulics. There should be no water entry.
2. If leakage is apparent, adjust the shaft log hose clamps.

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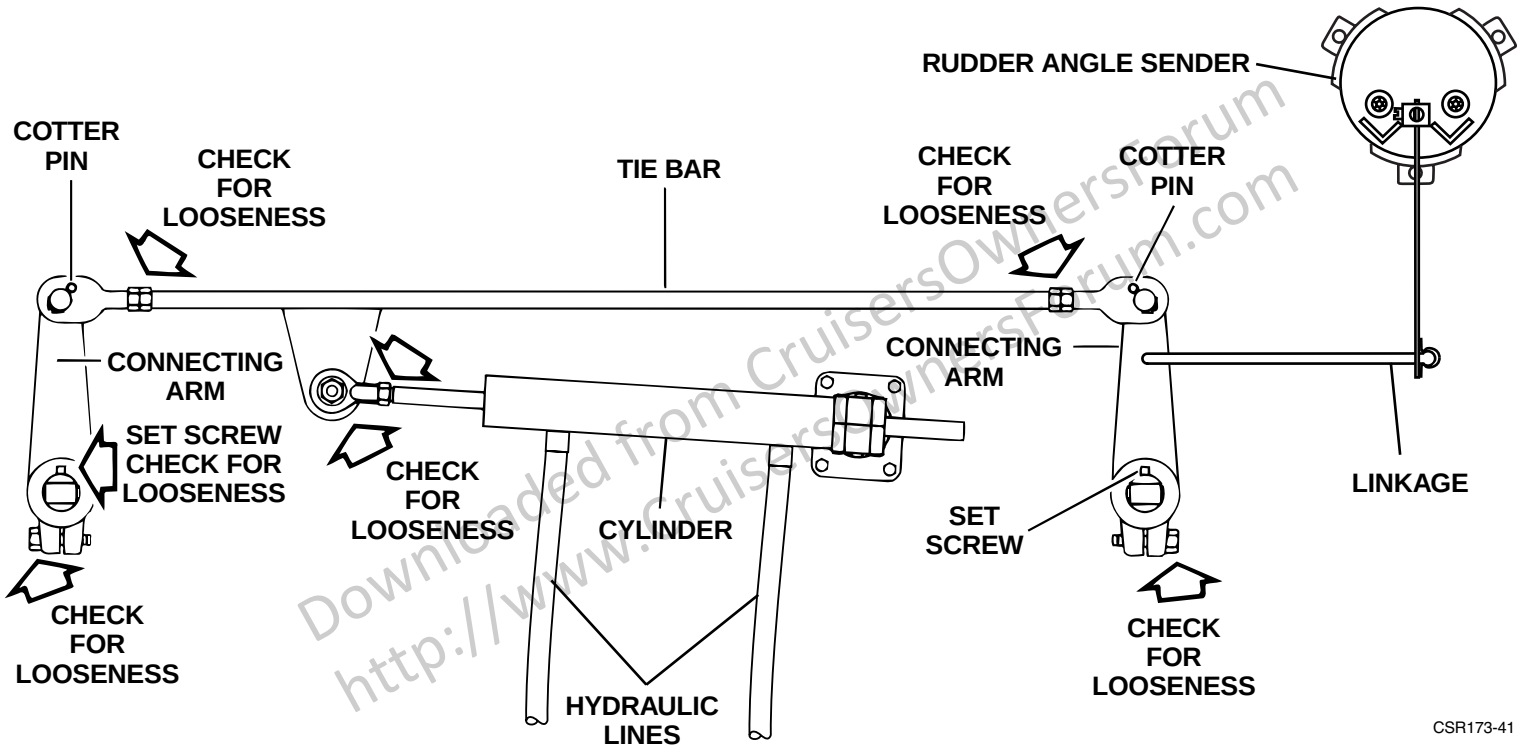

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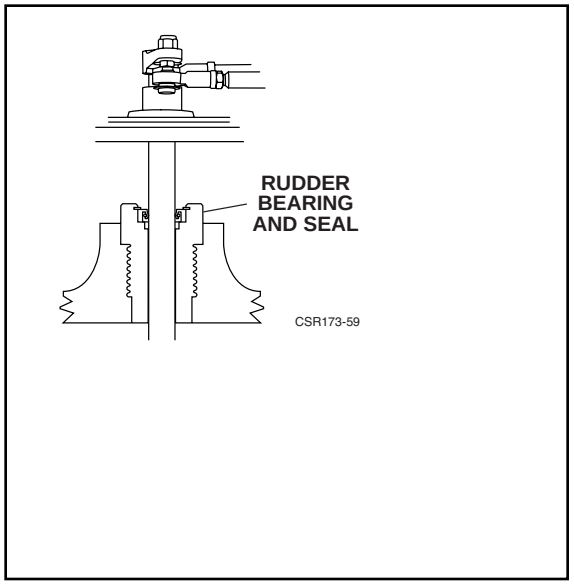


CAUTION

Cruiser Yachts Inc. will not warrant damage incurred due to an improperly adjusted or neglected shaft log. Excessive water entry could result in the submergence of the engine compartment.

Tighten the shaft log hose clamps using only hand pressure.

INSPECT PROPELLERS FOR DAMAGE

1. Check propellers for bends, cracks and pitting.

2. Do not continue to use badly damaged propellers. Damaged propellers must be replaced. See Section 8 for details.

Every 100 Hours

INSPECT FRESHWATER SYSTEM FOR LEAKS

1. Fill and pressurize freshwater system.

2. Lift engine hatch.

3. Inspect connections at freshwater reservoir, filter, pump and pressure accumulator. There should be no signs of leakage. If leaks are apparent, drain system and replace defective hoses, tubes and clamps. See your Cruisers Yachts dealer for parts and service.

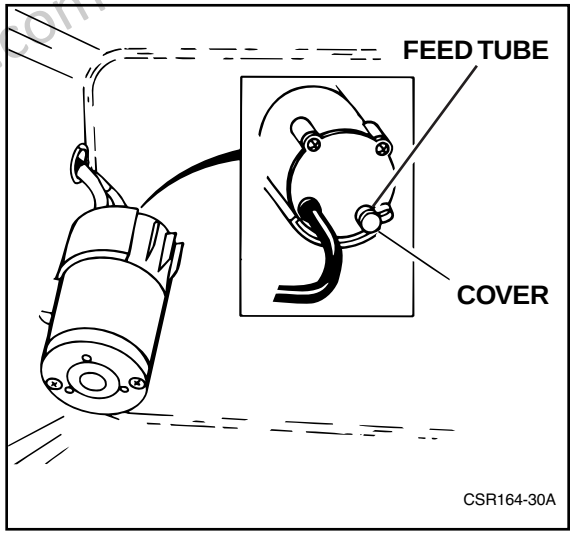
4. Inspect connections at water heater. There should be no signs of leakage. If leaks are apparent, drain system and replace defective hoses, tubes and clamps. See your Cruisers Yachts dealer for parts and service.

CLEAN BILGE

See Section 8, GENERAL MAINTENANCE for details.

Monthly

LUBRICATE AIR HORN COMPRESSOR



1. The compressor is located behind the dash panel at the helm.

2. Locate the compressor's oil feed tube.

3. Remove feed tube cover and add 4 to 7 drops of oil.

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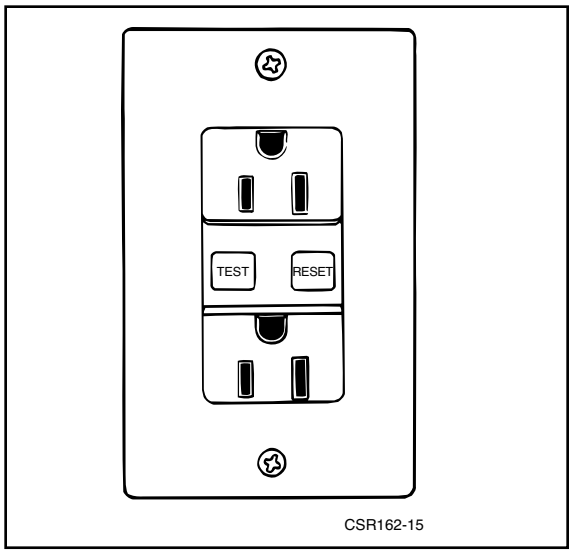
TEST GFCI OUTLET



1. Provide AC to the boat with either a shore power hookup or the onboard generator (if installed). Turn the appropriate breaker(s) on.
2. Turn the outlet circuit breakers “ON” located on the AC master panel.
3. Locate the GFCI circuit breaker.
4. Push the test button on each GFCI outlet. Power should be interrupted to all outlets onboard. Press the reset button to restore power.
5. If power is not interrupted, do not use any of the outlets. Have a qualified electrician make the necessary repairs.

CHECK ZINCS

CAUTION

Failure to maintain the zinc anodes on your boat will result in electrolytic corrosion to all submerged metal.

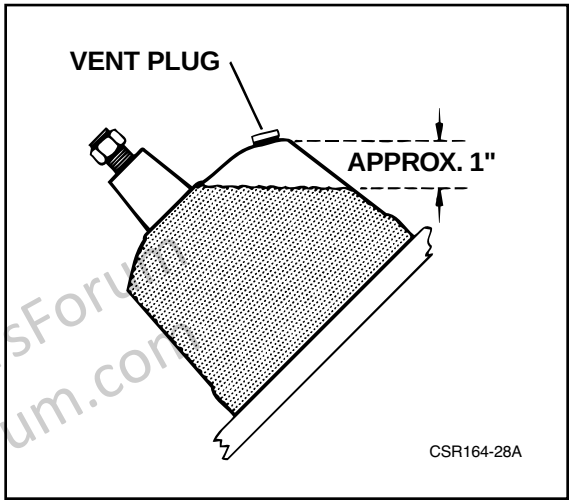
1. Check dealer installed zinc anodes for excessive corrosion. Your dealer will point out their locations at time of delivery. Keep this outline in your Skipper’s Kit.

Quarterly

CHECK BATTERY ELECTROLYTE LEVEL

See Section 8, GENERAL MAINTENANCE for details.

CHECK HYDRAULIC STEERING SYSTEM OIL LEVEL



1. Remove vent plug from fill hole on helm pump.
2. Visually inspect oil level. Recommended oil level is approximately 1" from top of fill hole.
3. If oil needs to be added, refer to your hydraulic steering owner’s manual for filling and bleeding instructions. Use grade of oil recommended by manufacturer.
4. DO NOT remove the cap from the lower station helm.

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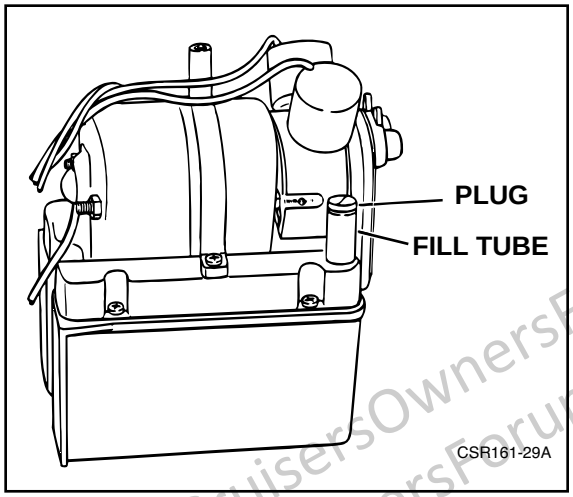
Annually

CHECK TRIM TAB PUMP FLUID LEVEL

1. A fluid level line has been added to the oil reservoir of the trim tab pump. The oil level is visible through the translucent sides of the reservoir.
2. If oil is low, replenish in the following manner:

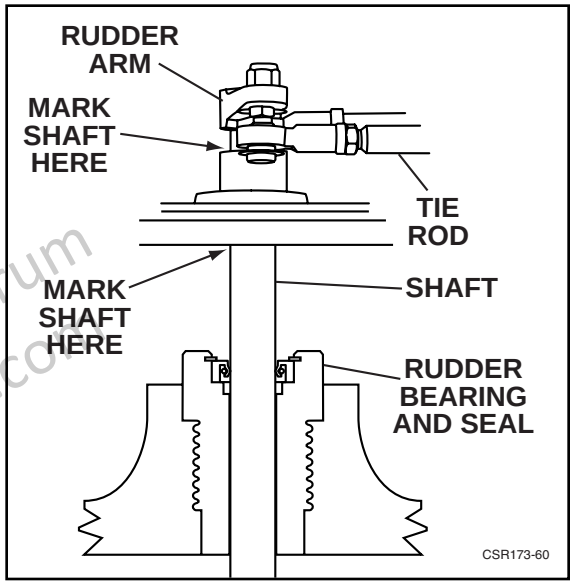
   Remove plastic cover by unscrewing center screw.



Remove plug from fill tube and use a funnel with a tube to add lubricating oil. Fill only until oil reaches the full line indicated on the reservoir.

CHECK ENGINE TO SHAFT COUPLING ALIGNMENT

See Section 8, GENERAL MAINTENANCE for details.



LUBRICATE RUDDER SHAFT

Lubricate with a waterproof marine grease.

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LUBRICATE SEACOCKS

1. Lubricate the following seacocks:

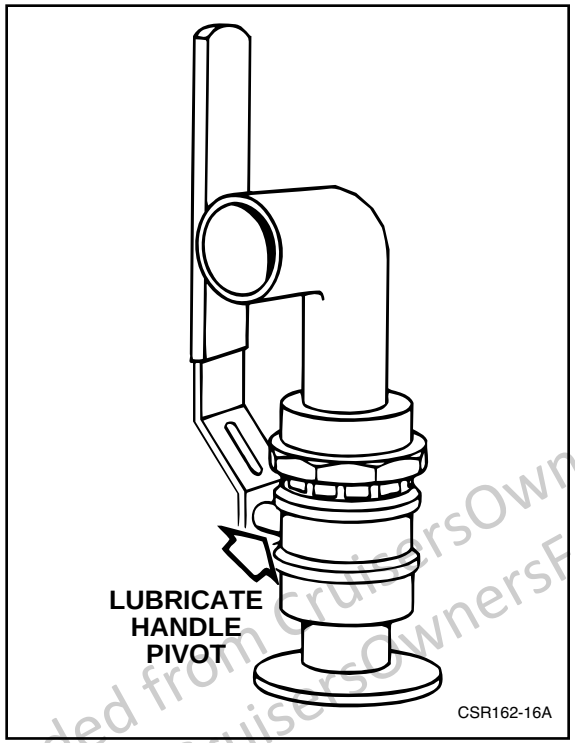
   Port and starboard engine cooling water seacocks located in the engine compartment.

   Generator cooling water seacock located in the engine compartment.

   Air conditioning seacock located in the engine compartment.

   Head outlet water seacocks located in the engine compartment and the generator compartment.

2. Use lubricating oil and lubricate the wing screw threads and the valve handle at its pivot point.



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CHECK ENGINE MOUNTING HARDWARE

1. Check engine mounting hardware for looseness.

2. If mounting is loose, temporarily tighten and then have an engine and propeller shaft alignment done as soon as possible.

Additional Pre-Launch Checklist

OUT OF THE WATER:

- ❑ Inspect and lubricate seacocks. Hoses and hose clamps should be inspected and replaced as necessary.
- ❑ Replace deteriorated zincs.
- ❑ Inspect prop(s) for dings, pitting and distortion. Make sure cotter pins are secure. Grip the prop and try moving the shaft – if it's loose, the cutlass bearing may need to be replaced.
- ❑ Check to make sure the rudder stock hasn't been bent.
- ❑ Make sure your engine intake sea strainer is free of corrosion and properly secured.
- ❑ Check power steering and power trim oil levels.
- ❑ Inspect outer jacket of control cables. Cracks or swelling indicate corrosion and could mean that the cable should be replaced.

❑ Inspect bottom paint for deterioration, prep and paint any bare areas. If you are using “ablative” bottom paint, make sure to lightly scuff bottom 24 hours before launching to reactivate the paint.

ENGINES AND FUEL SYSTEMS:

❑ Inspect fuel lines, including fill and vent hoses, for softness, brittleness or cracking. Check all joints for leaks and make sure all lines are well supported with non-combustible clips or straps with smooth edges.

❑ Inspect fuel tanks, fuel pumps and filters for leaks. Clamps should be snug and free of heavy rust. Clean fuel filters.

❑ Inspect cooling hoses and fittings for stiffness, rots, leaks and/or cracking. Make sure they fit snugly and are double-clamped on all hoses below water line.

❑ Every two years remove and inspect exhaust manifolds for corrosion. Undetected exhaust manifold failures can cause serious engine damage.

❑ Clean and tighten electrical connections, especially both ends of battery cables. Wire-brush battery terminals and fill cells with distilled water.

❑ Inspect bilge blower hose for leaks or blockage.

❑ If stored with full fuel tanks we recommend adding “Stabil” or some type of Isopropyl additive to reduce moisture in gasoline powered boats.

IN THE WATER:

❑ Check the engine shaft and rudder stuffing boxes for steady leaks and looseness. If equipped with Tides Dripless Shaft Logs, make sure to read the literature so they are torqued to proper specifications.

❑ Use a hose to check for deck leaks at ports and hatches. Renew caulks or gaskets as necessary.

❑ Check engine mount bolts to ensure they are tight.

❑ Check engine alignment and coupler bolts.

MISCELLANEOUS:

❑ Check expiration dates on flares and fire extinguishers.

❑ Inspect bilge pump and float switch to make sure they are working properly.

❑ Inspect dock and anchor lines for chafing.

❑ Update or replace old charts, waterway guides.

❑ Make sure your boating license and/or registration is up to date.

❑ Review your boat insurance policy and update coverage if needed.

❑ Make sure you have properly sized and wearable life jackets in good condition for each passenger, including children and pets.

This information is being provided as a courtesy to our dealers and customers to help promote a safe and enjoyable boating season.

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Section 7 – Storage for Extended Lay-Up

STORAGE FOR EXTENDED LAY-UP... 7-2
Lifting and Storing Your Boat 7-2
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Winterization 7-3
Fitting Out After Storage 7-6

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STORAGE FOR EXTENDED LAY-UP

Lifting and Storing Your Boat

CAUTION

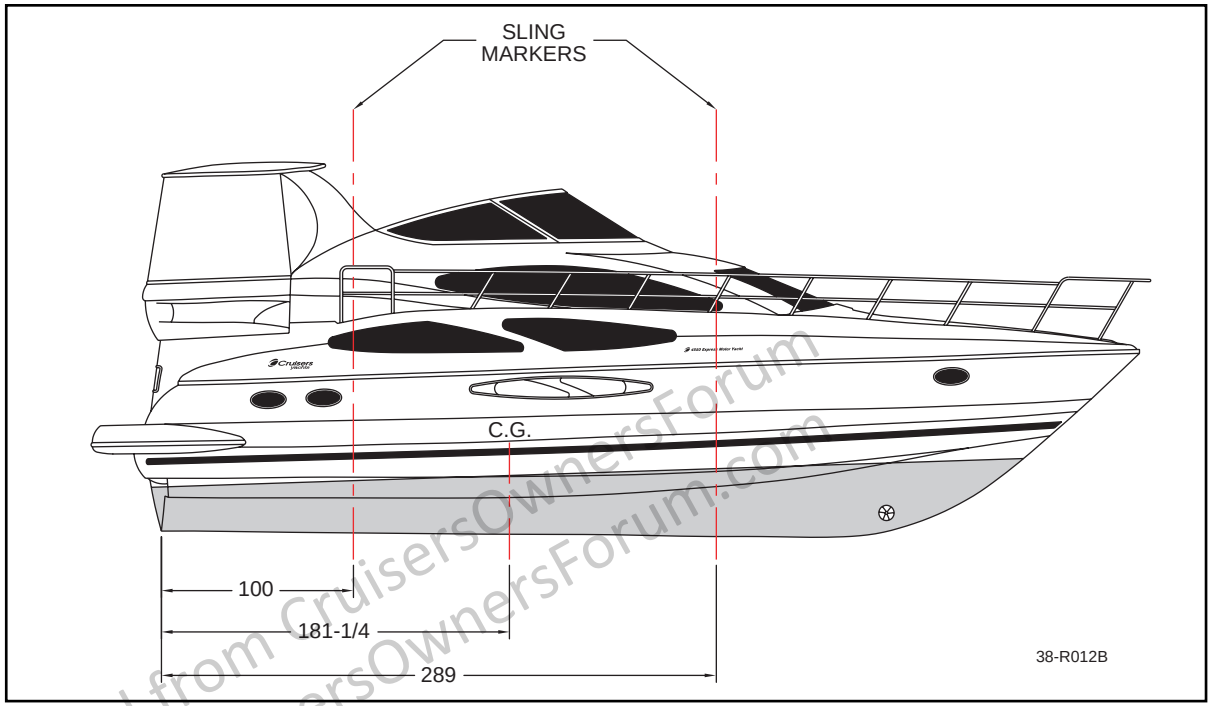
Never lift a boat with a large amount of water in the bilge! Undue stress will be put on the hull.

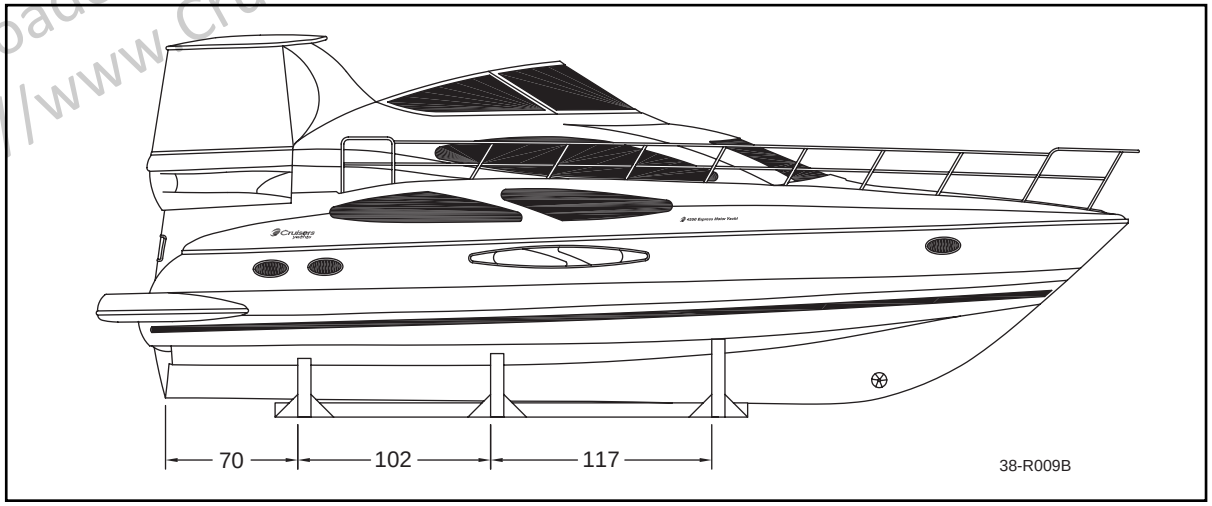
Slings must never contact or exert a force on shafts, struts or hardware protruding from the hull. This type of stress can damage fiberglass, bend or misalign parts, which is not covered under the warranty.

Use two web slings and 16 foot spreader bars to lift the boat. Slings must have a minimum width of six inches and a capacity rating high enough to support the boat. Spreader bars reduce the side pressure at the boat's sheer line and prevent distortion or damage to the deck or gunwale molding.

Put slings around the hull at positions marked "SLING". The sling decal is located just under the gunwale molding. Make sure the sling contacts the bottom of the hull for the entire length with no twists in the sling.

When lifting the boat. keep the bow slightly higher than the stern to keep water from running into engine manifold. Water can cause corrosion or damage to the engine.





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CAUTION

When your boat is out of the water, it is important to support the hull correctly to avoid any hull damage.

The shipping/storage-cradle will provide the proper support at the recommended positions. The load at the cradle support areas is less than 10 pounds per square inch. Make sure the cradle is level and completely supported on the ground to eliminate any cradle or hull distortion. Contact your Cruisers Yachts dealer to order a cradle.

If a factory-supplied cradle is not available, extreme care should be used to support the hull as shown on Page 7-2. Do not support boat by resting hull on keel; the load will be more than 10 pounds per square inch! Vertical supports must extend from chine to keel to chine with no gaps between the hull and cradle supports. Protect all items extending from the hull from resting on the support or ground. DO NOT apply any load stress to props, shafts, rudders, struts, etc.

If a cradle can't be used, use foam blocks on the keel and jackstands on the chine.

Transporting

The boat must be supported on a trailer with the same care and concern as on the ground. Cover the boat to prevent additional load being added from rain or snow. Contact your dealer for assistance in transporting your craft.

Transporting Checklist

- Check all federal, state and local regulations and requirements to transport your boat. Arrange for any permits and escorts as required.
- Disconnect and remove batteries to prevent accidental sparks and spilled electrolyte.
- Empty fuel tanks to prevent fuel fumes, spilling and possible fire.
- Empty freshwater system to reduce transportation weight.
- Remove all items from cabinets, pockets and drawers to eliminate damage.
- Secure all drawers, cushions, doors, etc. to prevent any cabin damage from items moving around during transport.
- Secure hatches, windows, doors and canvas to prevent damage from wind and accidental opening.
- Cover and tie the boat down securely to avoid any shifting, tipping or sliding during transport.

Winterization

CAUTION

If improperly stored, the boat could take on water which can accumulate and cause damage to onboard systems.

If your boat is to be stored on shore, a thorough winterizing procedure will extend the life of your boat and its equipment. Utilize the following suggestions to make boat prep for the next boating season a little easier.

1. Clean the hull and deck as soon as the boat is pulled from the water. This will make cleaning easier because the marine growth will still be wet. (See the Care and Cleaning section in this manual.)
2. Store the boat with the bow up so any accumulation of moisture will run off.

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3. Inspect the hull and underwater gear for signs of deterioration, wear or damage. Note any damages to engine, cabin equipment, helm area, etc. that has occurred during the past boating season. Try to have any repairs made before covering the craft.

4. Fuel System:

   IMPORTANT

   Do not fill the tanks so fuel flows from the vents. Allow room in the tanks for expansion.

   a. Fuel tanks should be filled with treated fuel to prevent condensation. Use the following products per instructions on container.
   Diesel- use a biocide, such as "BIOBOR" and conditioner, such as "RAYCOR RX 100."

   b. Run engines for 10 minutes to make sure treated fuel is present in all lines and parts of the engines.

5. Engines:

   a. Flush engines with clean fresh water.

   b. Refer to the engine owner's manual for procedures to store and winterize the engines.

6. Generator Engine:

   a. Flush engine with clean fresh water.

   b. Refer to the engine owner's manual for procedures to store and winterize the engine.

7. Remove the drain plug at the bottom of all exhaust mufflers to prevent freeze damage. (This includes the generator muffler.) Store plugs in a safe place.

8. Head and Holding Tank:

   a. Empty and rinse holding tank with water until tank is clean.

   b. Pour 1 gallon of non-toxic anti-freeze into each toilet bowl. Flush each head so the anti-freeze reaches the holding tank.

   WARNING

   DO NOT use automotive type radiator antifreeze under any circumstances! It is poisonous. See your marine or recreational dealer for non-toxic antifreeze.

   c. If equipped with macerator discharge and the boat is removed from the water, operate macerator pump just long enough so antifreeze runs through pump and lines.

9. Air Conditioning System:

   a. Open intake seacock. Loosen screws on the seawater pump head to allow water to drain from pump.

   b. Disconnect intake and all unit supply hoses.

   c. Flush units and lines to strainer and seacock with clean water.

   d. Blow water out of lines with low air pressure.

   e. Disconnect hoses from both condensing units.

   f. Close air conditioning intake seacock.

   g. Remove drain plugs from seacock and strainer. Allow to drain and replace drain plugs.

10. Cockpit Wash System:

    a. Close intake seacock and remove intake hose.

    b. Put hose in a bucket of non-toxic antifreeze. Operate system until antifreeze solution is discharged from system.

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c. Turn system off and relieve pressure in hose, if connected.

d. Remove drain plug from cockpit wash seacock. Allow to drain and replace drain plug.

11. Bilge Pumps:

In areas where temperatures are below freezing, the bilge must be pumped out and sponged completely dry. Check for areas that do not drain completely to the pumps. There are no hull drain plugs.

12. Shower Sump and Sink Drains:

a. Check that master battery switch is in the “ON” position.

b. Pour non-toxic antifreeze in the shower drain until the pump discharges the antifreeze overboard.

c. Turn battery master switch to the “OFF” position.

d. Pour non-toxic antifreeze in all sink drains until the anti-freeze is discharged overboard.

13. Freshwater System:

a. Place FR WATER PUMP switch in the “OFF” position.

b. Remove the freshwater supply by opening the hot and cold faucets in the galley for 10 minute intervals. Repeat the procedure until the freshwater tank is empty.

c. Open all faucets onboard - galley, head, shower, vanity, cockpit shower, etc.

d. Disconnect inlet and outlet hoses from freshwater pump. Make sure accumulator tank is drained.

e. Remove freshwater filter bowl and strainer. Clean, dry and replace strainer bowl.

f. Drain the water heater. Lines from the engine heat exchanger must be disconnected. Drain exchanger and lines.

g. Use low air pressure at freshwater pump outlet hose to blow water from all water lines.

h. Connect outlet hose to freshwater pump. Pour approximately 1-1/2 ounces of potable alcohol into the pump inlet. Rotate pump pulley two turns by hand and connect inlet hose.

14. Refrigerator/Freezer:

a. Place REFRIG circuit breaker to “OFF” position.

b. Discard any ice cubes.

c. Wipe unit dry and leave the door blocked open during storage.

15. Remove strainer and seacock drain plugs to prevent damage from freezing. Close all seacocks.

Strainers	*Seacocks*
Engines	Engines (2-intake)
Generator	Generator (intake)
Freshwater system	Air conditioning (intake)
Air conditioning system	Head system (outlet)

16. Batteries:

a. Be sure the master battery switch is in the “OFF” position. Remove batteries from the boat and store in a non-freezing area.

b. Put batteries on a wooden pallet or bench.

c. Keep batteries on a trickle charge. Check and maintain electrolyte levels regularly.

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17. Interior Preparations:

    a. Remove items that will hold moisture and cause mildew such as life jackets, towels, blankets, cushions, mattresses, clothing, curtains, canvas, etc.

    b. Scrub the inside of the boat. Clean the cabinets, drawers and cupboards. Try to allow one day for drying and airing out the cabin area as weather permits.

    c. If mattresses and cushions are left onboard, stand or prop them up to allow good air circulation around them. Hang life preservers and other equipment to avoid mold and mildew.

18. Exterior Preparations:

    a. The bottom will require at least one coat of anti-fouling paint before beginning a new season. This can be done when winterizing or at the start of the new season. Consult your Cruisers Yachts dealer for paint specifications for your area.

    b. Apply a coat of wax to the entire surface of the boat. Put rust inhibitor on all deck hardware and other metal parts. Consult your Cruisers Yachts dealer for product recommendations.

NOTE

If possible, do not seal cabin or cockpit tightly. Dry, fresh air will ventilate these areas preventing mold and mildew.

19. Cover your boat with a tarpaulin or mooring cover. If the boat is stored outside, additional supports under the tarp or cover may be necessary to prevent pockets that will collect snow or rain. This can add extra load to the hull and cradle and also stress the cover, possibly tearing it.

Fitting Out After Storage

A thorough check of your boat after an extended storage period for any type of damage is necessary. Look for items such as cracks or breaks due to freezing, fiberglass stress cracks in hull or deck, fuel or water leaks in seals or seams. The following steps will assist you in getting your boat back into the water.

1. If anti-fouling paint and wax was not applied before your boat was stored, apply them now.

2. Inspect all through-hull fittings, shafts and rudder seals for tightness and possible leakage. Do not overtighten.

3. Inspect the entire fuel system for leaks or deterioration. Replace parts as necessary.

4. Open and close all seacocks to check operation. Install all drain plugs in strainers and seacocks.

5. Check all hoses and fittings for cracking, splitting or deterioration. Replace defective parts immediately.

6. Batteries:

    a. Make sure battery or batteries are fully charged and the electrolyte level is approximately 1/2" above the internal plates.

    b. Clean battery posts and cables. Use a solution of baking soda and water to clean battery cases.

    c. Install batteries and connect battery cables. Apply a small amount of grease or petroleum jelly to cover the posts and cable clamps.

    d. Turn master battery switch to the “ON” position.

7. Install drain plugs in bottom of all mufflers. Inspect exhaust system from engine to hull outlet. Make sure hoses, mufflers, fittings and clamps are water and exhaust tight.

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8. Connect all hoses that were disconnected for winter storage.

9. Freshwater System:

   a. Close all faucets onboard.

   b. Fill freshwater tank with approximately 50 gallons of pure drinking water. Turn freshwater pump circuit breaker to “ON.”

   c. Open hot and cold faucets in galley slightly to allow air to escape and fill water heater. Close the faucets when a steady flow of water is present.

   d. Bleed air from all remaining faucets as in Step “c.”

   e. The pump will run until operating pressure is reached and will then shut off. Continue to fill freshwater tank to its capacity (135 gallons).

10. Refer to engine owner’s manual for procedures to put engine into service after an extended storage.

11. Refer to generator owner’s manual for procedures to put generator back into service.

12. Put miscellaneous equipment such as mattresses, cushions, curtains, life jackets, etc. onboard.

13. Make sure all seacocks are closed and launch boat.

CAUTION

Remain with the boat for a minimum of 8 hours after launching the boat. This will allow time to check hull for any leaks and correct the problem before the boat is swamped.

14. After boat has been launched, engine-to-shaft alignment must be checked. Refer to Section 8, GENERAL MAINTENANCE for this procedure.

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Section 8 – General Maintenance

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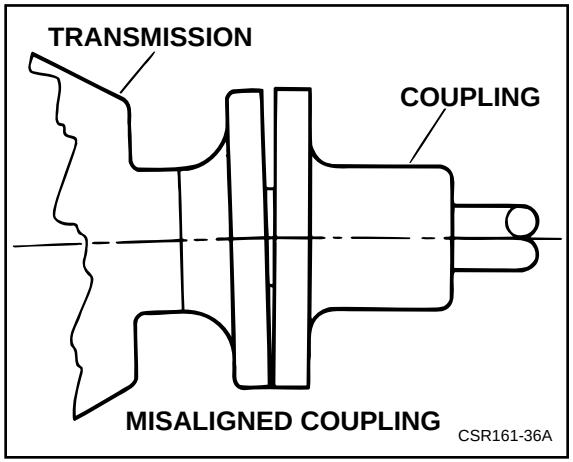
GENERAL MAINTENANCE

Power Train

COUPLING ALIGNMENT



Slight coupling misalignment can cause vibrations, loss of power and damage to crankshaft bearings. Check coupling alignment using the following procedure:

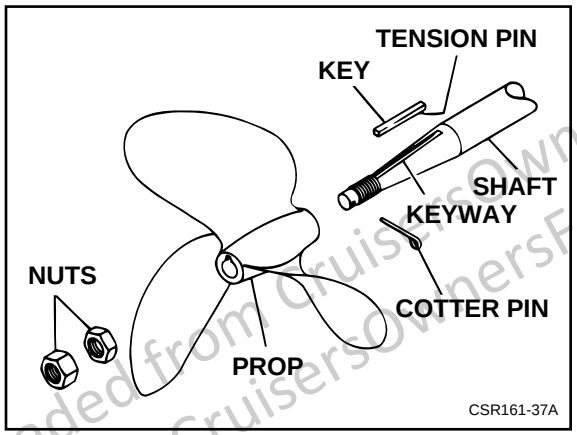
1. Remove the coupling bolts and slide the coupling apart only slightly.

2. With a feeler gauge, measure the gap between the coupling halves at four places 90° apart. The difference in the readings must not exceed 0.003".

3. Using the adjustable engine mounts, adjust engine until coupling is in alignment. (See your Cruisers Yachts dealer.)

4. Leave coupling half on transmission stationary and rotate the propeller shaft 1 turn, in 90° intervals. At each 90° interval, check the clearance between the coupling halves. If the four measurements differ by more than 0.003", the propeller shaft may be bent.

PROPELLER REPLACEMENT



The following steps represent a typical propeller installation procedure. Refer to the propeller manufacturer's recommended procedure if different.

1. Remove any small burrs on tapered end of propeller shaft using a honing stone.

2. Apply a thin layer of "prussian blue" on the tapered section of the shaft.

3. Slide the prop on the shaft and rotate it slightly on the shaft. Remove the prop.

4. Where the prop contacts the shaft the blueing will be gone. About 60% contact is required between the prop and the shaft. If sufficient contact area is obtained, go to Step 7.

5. If the contact area is small, apply a course valve grinding compound to the taper of the shaft. Install the prop and rotate it on the shaft clockwise and counterclockwise about 100 times.

6. Remove the prop and clean the grinding compound from the shaft and prop. Repeat Steps 2 to 4.

7. Apply a light layer of waterproof grease to taper area of shaft.

8. Install the key and prop on the shaft. The key should fit tight from side to side. There should be a slight clearance between the top of the key and the groove in the prop. If there is no clearance, the prop can be forced off center causing vibration.

9. Drive the prop all the way up the shaft by installing and tightening the large nut.

10. Install the small nut. Hold the large nut while tightening the small nut to lock the nuts in place. Install the cotter pin and bend the ends over to hold it in place.

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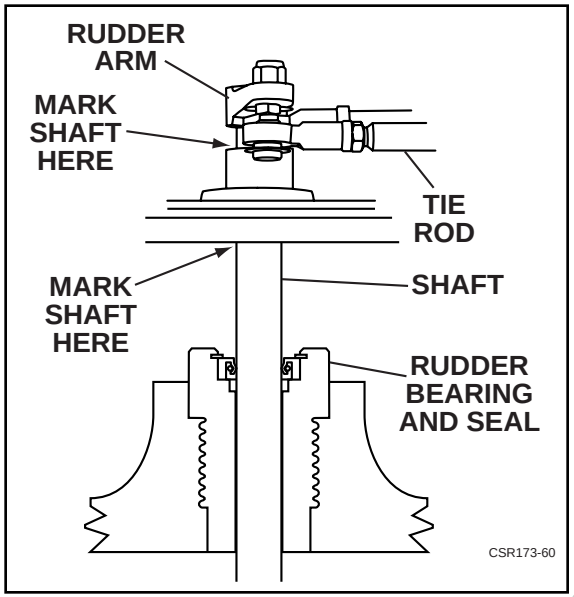
RUDDER REPLACEMENT



With the boat out of the water, the following procedure can be used to replace a rudder:

1. Mark shaft for vertical position.
2. Have a second person outside the boat remove the rudder as the hardware is loosened.
3. Transfer marks for vertical position to new rudder shaft.
4. Loosen the hardware to remove rudder arm from the rudder shaft. Lower the rudder from the boat.
5. Insert red collar to protect O-ring.
6. Install a new rudder and hold it in place while collar is installed, To ease installation, spray shaft with lubricant.
7. Install rudder arm. Adjust vertical position of rudder with markings you made on shaft.
8. Tighten rudder arm hardware.
9. Inspect and lubricate tie rod ends.
10. Adjust tie rod length to align both rudders.

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DC Electrical System

CHARGE BATTERIES

The standard batteries furnished by Cruisers are “MAINTENANCE FREE.” Follow the recommendations of the battery manufacturers for proper maintenance.

The batteries will be charged, when the engines are running, by the engine alternators. All batteries can be charged from dockside power or from generator power. When the dockside power is connected or the generator is running, the batteries can be charged by moving the BATTERY CHARGER and the BOW THRUSTER BAT CHARGER circuit breakers to the “ON” position.

Freshwater System

CLEAN THE WATER TANK

Fill the freshwater tank using a plastic hose. Rubber hoses can add an objectionable taste to the water.

To clean your new freshwater system, or the system after a long period of storage, use the following procedure:

1. Make a solution of 2-1/2 cups (20 oz.) of household bleach and 10 gallons of water.
2. Pour the solution into the empty tank and fill the tank with freshwater.
3. Start the freshwater pump and bleed all the air from the freshwater system. Start with the faucet farthest from the pump.
4. Allow the treated water to stand for 3 to 4 hours.
5. Drain the tank and lines. Flush the entire system with clean freshwater. Fill the tank with freshwater.
6. If an excessive chlorine taste is still present, make a solution of 1 quart of vinegar and 5 gallons of water. Add the solution to the system and let it remain in the system for several days.
7. Drain the system and flush with clean freshwater. Fill the tank and bleed the air from all the lines.

Bilge

CLEAN THE BILGE AREA

Pump bilge area dry and remove all loose dirt. Make sure all drain passageways and bilge pump strainers are clear.

After time, the bilge will collect dirt and oil. DO NOT use flammable solvents to clean the bilge. Frequent cleaning with a commercial bilge cleaner will loosen oil and dirt and make cleaning easy. Consult your Cruisers Yachts dealer for instructions and use.

Hull

GELCOAT CARE

A complete washdown of all exterior gel coated surfaces with a mild detergent and clean water after each outing is recommended. DO NOT use detergents that contain ammonia or chlorine. Alcohol or kerosene may be used for stubborn stains. Light sanding and buffing will remove most stains and shallow scratches.

In areas where your boat is stored for winter months, a pre-launch waxing for the season should suffice. In southern areas, wax the exterior surfaces at least semi-annually. A specially formulated fiberglass wax is recommended to prevent any color fade and soil adhesion. If waxing alone does not bring back the shiny appearance, hand buffing with DuPont #7 Rubbing Compound or power buffing with Mirror Glaze #1 may be necessary.

GELCOAT REPAIR

Scratches or blemishes in the gelcoat may detract from the appearance of your boat but they do not affect the strength or integrity of the fiberglass hull or the component which the gelcoat covers.

A gelcoat repair kit (available from your authorized dealer) permits the user to repair minor scratches and nicks in the gelcoat.

Minor scratches can be removed by wet sanding. Start with 320 grit first, sanding lightly until the scratch starts to disappear. Use 400 grit until the scratch is gone. Finish sanding with 600 grit and buff the area with rubbing compound. Rub hard at first and then lighten up to polish the area.

FIBERGLASS REPAIR

“Fiberglass” refers to fiberglass reinforced plastic construction of the hull, deck, and cabin fabrications beneath the thin gelcoat skin. Fiberglass repairs require the use of special tools and following precise repair instructions. Your Cruisers Yachts dealer is skilled in handling these repairs and also has available fiberglass repair kits for boat owners to make their own repairs, if capable.

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If you decide to make repairs yourself, tools and materials you will need are:

- Fiberglass Repair Kit
  - Acetone
  - Resin
  - Hardener
  - Fiberglass
  - 400 and 600 Grit Wet Sand Paper
- Polishers/Buffer
- Automotive-Type Rubbing Compound
- Putty Knife

An excellent resource booklet for instructions on small fiberglass repairs is “HOW TO REPAIR FIBERGLASS BOATS,” published by Ferro Corporation, Nashville, Tennessee, 37211.

ANTI-FOULING BOTTOM PAINT

Before selecting a bottom paint, talk with other boaters and your dealer to determine which product works best in your area. Many variables affect the bottom paint such as water temperature, pollution, salinity, currents, suspended dirt and organic matter, and sunlight.

Fiberglass hulls should never be sanded, cleaned, painted and launched in the same day. Moisture in the old paint must be allowed to escape completely to get good adhesion between the new and old paint. Also, allow sufficient drying time before launching your boat; follow paint manufacturer’s suggestions.

General Care and Cleaning

DECK FITTINGS AND HARDWARE

Stainless steel has been used wherever possible on your boat. It is not totally resistant to corrosion. Regular cleaning and polishing with a chrome or stainless steel polish will maintain and extend its life. A daily rinsing with clear water to remove any salt residue is suggested. A light wipe-down with WD-40 or LPS sprayed on a soft rag after each washdown will enhance its appearance.

Inspect all screws, clamps and fittings. Tighten any loose hardware when necessary.

EXTERIOR AND SEAT VINYL

Regular washing with mild soap and warm water or vinyl upholstery cleaner is sufficient to keep the cushions and vinyl coverings in good condition. Keep the cushions from becoming water soaked to prevent any mildew accumulation. Wipe the cushions dry and lightly spray them with Lysol to help prevent mildew.

INTERIOR WALL COVERINGS AND OVERHEAD

Vinyl interior wall coverings and ceiling panels may be sponge-cleaned with quality vinyl cleaners or with a 50/50 solution of mild detergent and water. Blot dry with a clean cloth after cleaning.

The alcatraz wall covering material should be vacuum cleaned first to remove all dirt. If the spot or stain is still there then use an all purpose cleaner. Try the cleaner in an area not readily visible to make sure that the cleaner does not discolor the fabric. Then blot dry with a clean cloth after cleaning.

The interior overhead may be cleaned with upholstery cleaner.

WINDOWS

- Plexiglass and Vinyl Windows.

  First, flush the plexiglass and vinyl with clean water. Use your bare hand with plenty of water to loosen any dirt. A clean soft rag may then be used with a mild non-abrasive soap or detergent. Dry carefully with a soft damp cloth or chamois.

- Sliding Windows.

  Avoid cleaners containing sodium or calcium hypochlorite or cleaners that give off a chlorine odor. These types of cleaners can damage the nylon pile window channel runners.

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THE FABRIC: *Seamark™* carries the *Sunbrella®* limited five year warranty.

This warranty covers the face of the fabric becoming unserviceable because of loss of color or strength from normal exposure conditions including sunlight, mildew, rot and atmospheric chemicals. It does not cover labor and installation supplied by the dealer.

Sunbrella® is made from 100% acylic fiber. It is a solution dyed fabric which gives it a color rightness which is unsurpassed. Being a woven fabric it breathes and is translucent, both of which are desirable characteristics. *Sunbrella®* has a fluorocarbon finish which provides excellent water repellency.

BOAT TOP VENTILATION

You have chosen the ultimate marine fabric. Haartz engineers have expertly waterproofed *Sunbrella®*, the premier woven acrylic fabric, by combining it with a textured marine grade vinyl. This design offers the best of both worlds - a beautiful, colorfast fabric with the added durability of vinyl.

To help prevent mildew, it is advisable to use *Seamark™* on all horizontal portions of

the top and *Sunbrella®* on all the vertical portions. This will help prevent mildew by allowing air to circulate. Extra ventilation may be needed depending on the design of the top. It is important to note that under the right conditions, mildew can grow rapidly regardless of how well the top is vented. Haartz recommends a program of regular cleaning (inside and out) before the top gets dirty to help prevent the spread of mildew.

IMPORTANT

For your safety and the safety of others, always make sure you follow the boat manufacturer's instructions for proper ventilation of engine compartment fumes.

CARE AND CLEANING (SEAMARK™)

Seamark™ fabric should be cleaned regularly before substances such as dirt or particles are allowed to accumulate on and become embedded in the fabric. The fabric can be cleaned without being removed from the installation. Simply brush off any loose dirt, particles, etc., hose down and clean with a mild solution of natural soaps such as Lux or Ivory in lukewarm water (no more than 100°F). Rinse thoroughly to remove soap. *DO NOT USE DETERGENTS*.

NOTE

Your bimini top and top section of your camper top is made out of *Seamark™* material.

CARE AND CLEANING (SUNBRELLA®)

1. *Sunbrella®* fabric should be cleaned regularly before substances such as dirt, roof particles, etc., are allowed to accumulate on and become embedded in the fabric. The fabric can be cleaned without being removed from the frame. Simply brush off any loose dirt, roof particles, etc, hose down and clean with a mild natural soap in lukewarm water (no more than 100°F). Rinse thoroughly to remove soap. *DO NOT USE DETERGENTS.*

2. Another method of cleaning for more stubborn cases is as follows: Soak the fabric for approximately twenty minutes in a solution of no more than 1/2 cup (4 oz.) bleach and 1/4 cup (2 oz.) natural soap per gallon of water at approximately 100°F. Rinse thoroughly in cold water to remove all of the soap.

NOTE

Excessive soaking in bleach can deteriorate sewing threads.

This method of cleaning may remove.part of the water repellency and the fabric should receive an application of an air-cur ing water repellent treatment, such as Barpellent, APCO or similar products, if water repellency is a factor.

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3. *Sunbrella®* may be dry cleaned but a water repellent treatment must be applied to the fabric after dry cleaning to reestablish water repellency. *Sunbrella®* is made from 100% acrylic fiber and is thermoplastic or heat sensitive. When washing or cleaning, *DO NOT SUBJECT TO EXCESSIVE HEAT* as the fabric will shrink. *DO NOT STEAM PRESS OR DRY IN ELECTRIC OR GAS DRYERS* but allow to air dry.

4. In cases where a *Sunbrella®* awning is taken down and stored during the winter season, it should be cleaned, allowed to air dry and stored in a dry, well ventilated area. Many fabricators offer a reasonably priced removal, cleaning, storage and rehanging service on a yearly basis.

5. For optimum appearance and performance *Sunbrella®* should be cleaned regularly.

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Section 9 – Accessory Items

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ACCESSORY ITEMS

Air Conditioning/Heater Unit

The air conditioning/heating unit consists of a heat pump unit and a seawater pump. The unit and pump receive 115 volts power from shore hook-up or the auxiliary generator. The seacock must open and the AIR CONDITIONER circuit breaker, must be “ON” to operate the heating/cooling system. Refer to the air conditioner owner’s manual for operating instructions.

The forward air conditioning unit is located under the forward stateroom berth. The mid unit is located under the salon sofa. The aft unit is located below the cabin entry stairs. The forward unit cools the forward stateroom and the forward head. The forward controls are located on the forward stateroom TV cabinet. The mid unit cools the salon and the third stateroom. The controls for the mid unit are located in the salon. The aft unit cools the galley, master stateroom and aft head. The controls for the aft unit are located in the master stateroom entryway.

CAUTION

Do not block return air grille. Keep air filters clean. Airflow restriction will occur, causing inefficient operation and unnecessary strain on the system.

Raw water is drawn from the seacock, through a strainer and to the pump. The pump supplies all units with a continuous flow of water in heating and cooling modes.

CAUTION

Inspect and clean strainer regularly; damage can occur to pump or compressors if the units do not receive a sufficient flow of water.

Refer to the heat pump manufacturer’s manual in the Skipper’s Kit for complete operation and service instructions.

Air Horn

The dual trumpet air horn is operated by pushing a button at the keypad. The horn circuit is protected by a resettable circuit breaker located on PME #2, located below the AC/DC panel.

The horn compressor is located behind the dash panel at the helm.

Battery Charger

The main battery charger is used to convert dockside or generator AC power to DC power to charge the engine cranking batteries and the house battery. An optional bow thruster battery charger charges the optional bow thruster battery.

The battery chargers can be turned on to charge batteries when the boat is connected to dockside power or when the generator is running and the DOCKSIDE or GENERATOR circuit breaker on the AC panel is switched “ON.”

To turn on the battery chargers, put the BATTERY CHARGER and the optional BOW THRUSTER BAT CHARGER circuit breakers at the AC/DC panel in the “ON” position.

For further information on the battery chargers refer to the owner’s manual(s) in the Skipper’s Kit.

Clarion Stereo (Standard)

The standard interior system for the 455 is a 12-volt Clarion head with CD and six disc CD changer. The deck speakers and subwoofer are powered by a 200 watt amplifier. The forward stateroom and master stateroom speakers are powered by a 100 watt amplifier. The speakers that are located in the salon dinette area are powered directly from the head unit. Each set of stateroom speakers has its own fader switch.

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Carbon Monoxide (CO) Detector

The carbon monoxide detector warns of carbon monoxide in the air and tracks the level over an extended period of time. The detector, with visible and audible alarms, operates on 12 volts DC. Locations for the detectors include the salon, vee berth and master stateroom.

Refer to your Skipper's Kit for carbon monoxide detector operating instructions.

Cockpit Shower

The shower head, hose, hot and cold valves are located on the stern transom. (Refer to page 2-4 for location.) The shower is functional only when the freshwater system contains water and the FR WATER PUMP circuit breaker is "ON."

Cockpit Washdown

The optional cockpit systems will function only when the freshwater system is activated and the freshwater pump circuit breaker is "ON."

The freshwater cockpit washdown fitting is located near the cockpit entry stairs on the port side. After use in salt water or brackish water, wash the boat with freshwater upon return to dock or slip.

Courtesy Lights

The cockpit courtesy lights are controlled from the keypad at the dash panel or from the switch just inside of the cockpit entrance door. The cockpit spreader lights are controlled from the keypad.

Covers

Bimini Top. The bimini top covers the bridge area. Separate covers are provided to protect the dash, wet bar and seating from inclement weather.

Refer to Section 8, paragraph "General Care and Cleaning", for care and cleaning of covers.

Refrigerator/Freezer

The refrigerator/freezer operates from 115 volts AC during shore hookup or auxiliary generator operation. The REFRIG circuit breaker, on the AC master panel, must be "ON" for AC volts refrigerator/freezer power.

The lower unit is the refrigerator and the upper unit is the freezer. Each door has a lock to prevent the doors from opening while underway.

See the refrigerator/freezer information in your Skipper's Kit.

Spotlight

The remote spotlight is mounted on the pulpit of the bow rails. The master battery switch must be on to operate the spotlight.

The spotlight is controlled from a joystick-keypad mounted at the helm.

SLOW - Press SLOW once to select slow light movement. Press again to turn light off.

FAST - Press FAST to select fast light movement. Press again to turn light off.

DIRECTIONAL MOVEMENT - The center lever is moved left, right, fore and aft to move the light beam.

AUTO SWEEP - With the light on, pushing this button will sweep the light in about a 90 degree arc automatically. Press again to stop sweep.

SOS/DISTRESS - Press and hold for about 5 seconds to automatically flash "SOS" in International Morse Code. The light will sweep horizontally while flashing. Press again to stop SOS flashing.

See spotlight information literature in the Skipper's Kit.

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Wet Bar

The wet bar consists of a sink with pressurized cold water and an ice maker. The ice maker receives power from 115 volt shore power hookup or auxiliary generator operation. To operate the ice maker, the freshwater system must contain water, and the FR WATER PUMP circuit breaker on the DC Master Panel and the ICE/MKR circuit breaker on the AC Master Panel must be "ON."

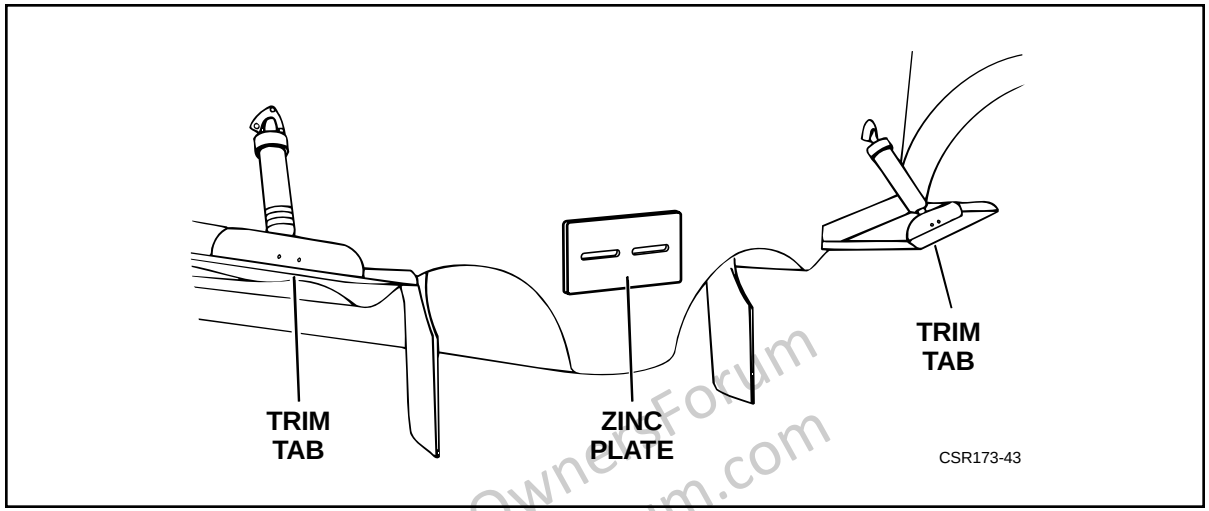
See the ice maker information in your Skipper's Kit.

Stove

The double-burner electric stove gets its power from 120 volts AC shore hookup or auxiliary generator only. It is protected by a circuit breaker in the AC master panel marked RANGE.

Trim Tabs

The two trim tabs located on the transom, help to correct the attitude and control your boat. The tabs are controlled individually by rocker-type switches located on the dash panel (see Section 3). A resettable circuit breaker located next to the switches protects the circuit from an overload. Push rocker switches in only half second intervals to avoid over correction.



The trim tab pump is located on the port aft corner of the rudder shelf board. The trim tab system uses Type A Dextron II automatic transmission fluid.

Refer to "Suggested Maneuvering Techniques" in Section 5 of this manual for information on trimming your boat. Also check your Skipper's Kit for further information on the trim tab system.

Windlass System

The windlass can be operated from the keypad or by the foot switches located near the windlass.

⚠ WARNING

When using the Winch DO NOT SWITCH IMMEDIATELY FROM ONE DIRECTION TO THE OTHER WITHOUT WAITING FOR THE WINDLASS TO STOP AS THIS COULD DAMAGE THE WINDLASS. Abuse is not covered by Warranty.

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WARNING

The Breaker/Isolator Panel provides protection for the main power supply and is also a means to isolate the circuit. The circuit breaker provides protection for the motor from excessive overload current and short circuit. It does not provide protection against excessive heat build up due to prolonged instant operation or repeated operation under overload conditions. Make sure you give the motor time to cool (6-8 minutes). Abuse is not covered by Warranty.

WARNING

When the Isolator Switch is "ON" the system can be activated at either the remote or the footswitches. When system is not being used, ensure that the power is turned "OFF" at the Breaker/Isolator Panel by pulling the button out. Firm pressure is required to push in or pull out the button.

Function of Clutch

1. The cone clutch engages and disengages the chainwheel from the winch drive. It is designed to be adjusted with the handle provided and to provide slippage if winch is overloaded.

2. Disengage the clutch by inserting the clutch release handle (provided) into the clutch nut and rotate the handle counter clockwise approximately one turn. Clockwise rotation engages the clutch.

Lowering the Anchor Under Power

Proceed as follows:

1. Check that the clutch is firmly tightened by inserting the handle provided in the clutch nut and rotating the handle clockwise (approximately one turn).

2. With the main circuit breaker/isolator panel "ON" the Winch may be operated by either the Remote Control toggle switch or using the footswitch (if fitted).

3. Hold (press) the switch down to pay out sufficient rope/chain rode to set the anchor.

Raising the Anchor Under Power

Proceed as follows:

1. Check that the clutch is firmly tightened by inserting the handle provided and rotating the handle clockwise (approximately one turn).

2. Start the boat's motor(s) and run at sufficient RPM to activate the charge system.

3. With the circuit breaker/isolator panel "ON" the Winch may be operated by either using the Remote Control toggle switch or the footswitch (if fitted). Hold (press) switch until the required amount of rope/chain rode has been brought in.

4. Motor up to the anchor while retrieving the anchor rode. Do not use the winch to pull the boat up to the anchor.

5. Care should be taken when docking the anchor. Jog in the last meter (few feet) carefully seating the anchor home in the bow fitting.

CAUTION

ENSURE THAT THE HANDLE IS REMOVED FROM THE CLUTCH NUT BEFORE OPERATING UNDER POWER.

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See your Skipper's Kit for more information on safe operation and service of the windlass.

Telephone Jack and Dockside Receptacle

The telephone includes a waterproof telephone inlet plug located on the stbd transom. Telephone jacks are conveniently located:

- FWD Stateroom, port side TV cabinet
- Master Stateroom, port shelf
- Salon, port aft

Oil Change System

SYSTEM START-UP PROCEDURES

When starting the system for the first time, air will be in all of the lines. Operating the system without oil or lubricant will damage the pump's impeller. Although your pump/motor unit was tested prior to shipment, the amount of oil surrounding the impeller may not be sufficient to ensure proper starting lubrication and vacuum. To avoid damage, the following procedure is advised:

1. Insert the PVC wand of the drain/fill hose into a container of a small amount (about 1/2 quart) of fresh oil.
2. Release the fail-safe lock device on the pump/motor unit valve handle and direct the arrow-shaped tip to STARBOARD.
3. Flip the motor control switch to the FILL position. The pump will start immediately and you will observe the oil moving through the clear plastic tubing toward the pump/motor unit. You should hear a noticeable change in sound (speed) of the pump motor when the oil enters the pump.
4. Continue to operate the pump for 5 to 10 seconds after pumping action begins, then return the pump/motor switch to "OFF" and secure the oil filler cap.

CAUTION

If oil does not move quickly through the clear tubing towards the pump, turn the switch to the "OFF" position, elevate the clear tubing until it nears the entrance of the pump, then flip the switch to the FILL position again. This will lubricate the pump and ensure a good starting vacuum.

DRAINING USED OIL FROM THE ENGINES

To ensure the oil maintains proper viscosity during the removal process, it is recommended the operator run the engines long enough to permit the engine block to become warm - at least 140°F. Shut the engines down and allow ample time for the circulated oil to return to the oil pan.

Draining the Port Engine

1. Warm engine to at least 140°F, then turn engine off.
2. Insert the PVC wand of the drain/fill hose into a container suitable for waste oil collection. (Remember, it is a legal requirement to dispose of waste oil in a responsible manner.)
3. Loosen the oil filler cap on the engine or remove the dip stick to allow air to enter the crankcase.
4. Release the fail-safe lick device on the pump/motor unit valve handle and direct the arrow-shaped tip to PORT ENGINE.
5. Flip the motor control switch to the DRAIN position. The pump will start immediately. You should hear a noticeable change in the sound (speed) of the pump motor when the used oil enters the pump.

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6. Continue to operate the pump until there is a noticeable change in the sound (speed) of the pump motor, which is an indication air is being drawn into the crankcase oil hose and that the specified crankcase is now empty. Oil is drained at the rate of about one gallon each 22 seconds.
7. Return the pump motor control switch to the “OFF” position when crankcase is empty and place the fail-safe switch in the “OFF” position.

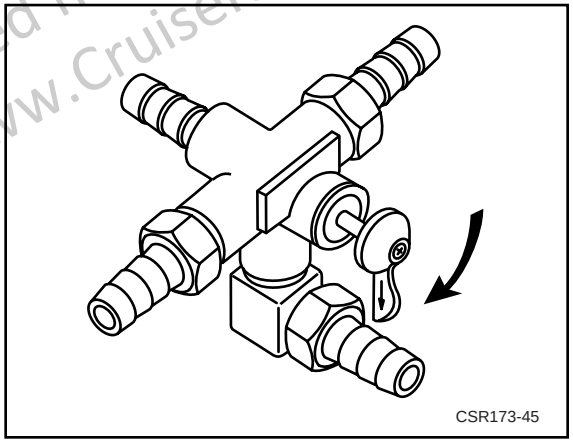
Draining the Starboard Engine

1. Repeat each of the steps outlined in “Draining the Port Engine” after directing the arrow-shaped tip on the valve handle to the STARBOARD engine.
2. Flip the motor control switch to the DRAIN position.
3. Once the crankcase is emptied, return the pump motor control switch to the “OFF” position and place the fail-safe switch in the “OFF” position.

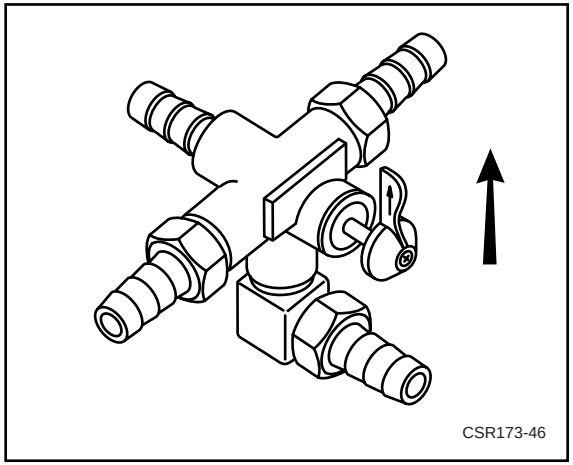
Draining the Generator (Models 946D and 946DB only)

1. Repeat each of the steps outlined in “Draining the Port Engine” after directing the arrow-shaped tip on the valve handle to the GENERATOR engine.
2. Flip the motor control switch to the DRAIN position.
3. Once the crankcase is emptied, return the pump motor control switch to the “OFF” position and place the fail-safe switch in the “OFF” position.

Draining the Generator (Models 946DT and 946DBT only)


CSR173-45

1. Repeat each of the steps outlined in “Draining the Port Engine” after directing the arrow-shaped tip on the valve handle to the GENERATOR engine.
2. Treating the selector handle on the externally mounted valve as a pointer, point the tip of the handle toward the hose barb connected to the generator.
3. Flip the motor control switch to the DRAIN position.
4. Once the crankcase is emptied, return the pump motor control switch to the “OFF” position and place the fail-safe switch in the “OFF” position. Return the externally mounted valve handle to “OFF” position.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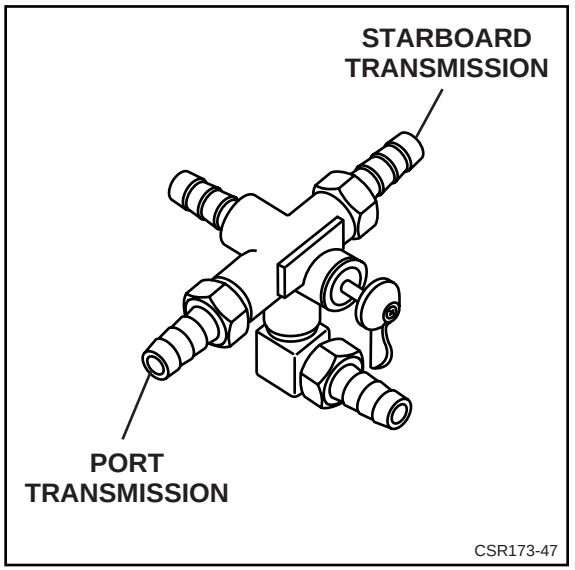
Draining the Port and Starboard Transmissions (Models 946DT and 946DBT only)



1. Repeat each of the steps outline in "Draining the Generator" after using the handle on the externally mounted valve as a pointer, point the tip of the handle toward the hose barb connected to the PORT and STARBOARD respectively.

NOTE

Vent the transmission if required. Most transmissions are equipped with a breather cap. If you are not certain your transmission is equipped with a breather cap, remove the dip stick from the transmission to allow air into the gear box.

2. Flip the motor control to the DRAIN position.
3. Once the transmission is emptied, return the pump motor control switch to "OFF" position and place the fail-safe switch in the "OFF" position. Return the externally mounted valve handle to "OFF" position.

Filling the Engines With Oil

If you are using the system to fill the engines for the first time, be sure you have carefully followed the "Start-up" instructions at the beginning of this section.

1. Before attempting to fill an engine, make certain the engine has been completely drained or is in need of a measured amount of additional oil. DO NOT OVERFILL!
2. Determine the type and amount of oil recommended by the manufacturer for each engine. Remember, FOUR QUARTS = ONE GALLON.
3. Use one of two methods to determine when the proper amount of oil has been delivered to the engine.
   a. Pre-measured Method – this method requires the operator to set aside a known quantity of oil prior to filling. For example, if the engine requires 22 quarts of oil, the operator may want to pump from a 5-gallon container, adding two (2) additional quarts as the container empties.
   b. Timed Method – the timed method is used when pumping from a container of unknown capacity, or a reservoir. The flow of oil through the system varies primarily with the viscosity and temperature of the oil. Under normal conditions (75°F to 85°F), the system pumps four quarts of 40 weight oil (1 gallon) in approximately 90 seconds.

NOTE

Models 946DB or 946DBT pump eight quarts (2 gallons) of 40 weight oil in approximately 90 seconds. Filling time is a function of several factors, including the oil temperature and weight. Oil (40 weight) at 85°F pumps approximately 20% faster than the same oil at 75°F. **Fresh oil should be 75°F or warmer before pumping!**

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Filling the Engines

1. Loosen the oil filler cap on the engine or remove the dip stick to allow air to enter the crankcase.
2. Insert the PVC wand of the drain/fill hose into a container of fresh oil.
3. Release the fail-safe lock device on the pump/motor unit valve handle and direct the arrow-shaped tip to PORT ENGINE.
4. Flip the pump motor control switch on the system to the “FILL” position. The pump will start immediately and you will observe the oil moving through the clear tubing toward the pump/motor unit. You should hear a noticeable change in the sound (speed) of the pump motor when the oil enters the pump.
5. Continue to operate the pump until a measured amount of oil has been pumped into the engine’s crankcase. Fresh oil is pumped at the rate of about one (1) gallon each 90 seconds.

   NOTE

   Models 946DB or 946DBT pumps fresh oil at a rate of two (2) gallons per 90 seconds.

6. Flip the pump motor control switch to the “OFF” position when the oil pan nears its filled capacity and check the proper oil level with the engine’s dip stick (or other measuring device supplied with the engine). If filling is completed, place the fail-safe switch on the “OFF” position.

   NOTE

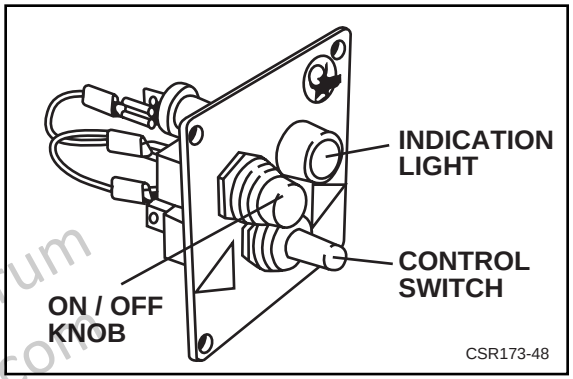
   If you have over-filled an engine, you may simply flip the motor control switch to the DRAIN position for a few seconds and remove the excess.

Bow Thruster

OPERATION

Cruisers uses the standard bow thruster control on your 455 series yacht. Operation requires both engines running to keep the bow thruster batteries charged.

The battery for the bow thruster is located under the hatch in the FSR. There is also a battery switch. The battery switch must be in the “ON” position for the bow thruster to operate.



To operate, push the ON/OFF knob and the indication light will illuminate. Move the control switch in the direction you wish to move the bow. For example, to move the bow to port, move the switch to port. This will engage the bow thruster propeller and move the boat to port. Turn off the bow thruster by pushing the ON/OFF switch. The indication light will go out showing the bow thruster is turned off.

ANNUAL MAINTENANCE

If marine growth is a problem in your area, paint the propellers and gear housing with an anti-fouling paint.

Change the zinc anodes once per boating season or more frequently, if needed. Always change zinc anode when approximately 40% of the anode is gone.

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Check oil level frequently. Oil level should be at least one half full. Change oil every other boating season or more often if desired.

Check the oil in the gear case at least once per season.

Make sure electrical cables are well tightened and uncorroded.

Make sure the bolts holding the gear case and electric motor are well tightened.

Check that the belt is well tightened and installed properly.

Central Vacuum

WARNING

Electrical shock could occur if used on wet surfaces.

- **DO NOT pick up hot ashes or cigarette butts.**
- **DO NOT operate this unit near flammable gases or liquids.**
- **DO NOT pick up water, damp materials or flammable powders.**
- **NEVER operate cleaner without filter bag.**
- **ALWAYS disconnect hose from inlet before changing bag.**

Your vacuum is located under the cabin entry stairs.

OPERATION

The vacuum motor is activated by inserting the hose into the receptacle on the cleaner.

Attach accessories by pushing firmly on end of hose or wand using a slight twisting motion to ensure proper seal.

SERVICE

Disposable Filter Bags

To change disposable dust bag:

1. Remove hose from inlet receptacle.
2. Pull up and out on front door, removing door and exposing bag compartment.
3. Remove use bag from intake tube and replace with new bag. Make sure rubber seal is mounted properly on intake tube to ensure correct position and proper sealing.
4. Replace front door making sure seal is established and maximum vacuum is maintained.

Secondary Filter

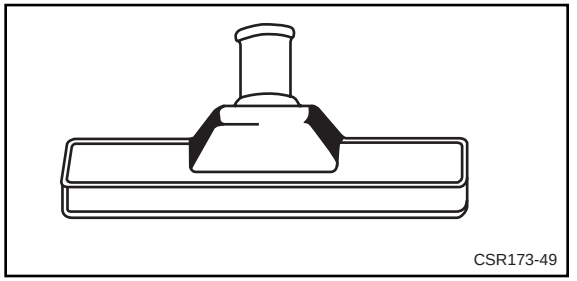
It is important that this filter be kept clean to obtain maximum power from your system. Filter can be cleaned using a mild detergent and allowed to air dry before replacing. This should be done every 6-8 months depending upon usage of unit. If filter become excessively worn or torn it should be replaced.

Replace Secondary Filter

Remove front door exposing bag compartment and secondary filter. Reach into cavity an pull secondary filter down and out, tugging gently. Install new or replace cleaned filter by inserting between wire clip and motor plate in the left hand corner of bag compartment. Replace door making sure it is in proper position to seal compartment.

USE AND CARE OF ACCESSORIES

Carpet Tool



This tool is specifically designed for use on carpets. It will do the best job when it is moved with both a forward and backward motion over the same area. The carpet tool should be held at an angle where it slides easily over the carpet.

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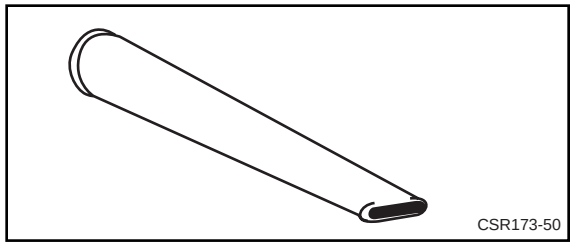
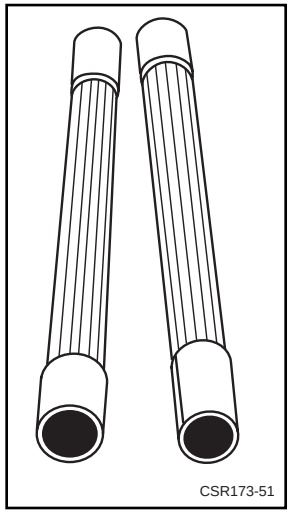
Crevice Tool



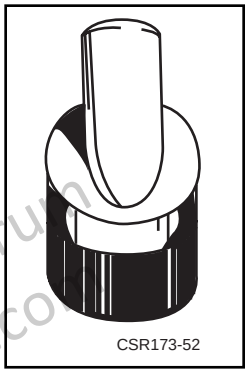
Used for pulling dirt out of cracks and crevices such as tracks for sliding windows, door jams and junction of walls and carpets.

Wands



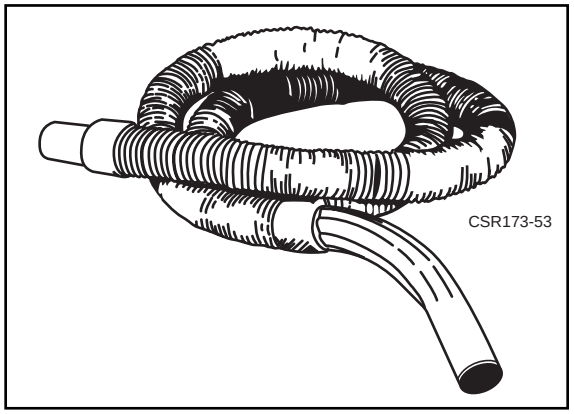
Consists of (2) 2' straight wands. The wand is assembled by pushing the tubes together and giving them a slight turn at the same time. To disassemble the wands, pull them apart while twisting.

Dusting Brush



Use it for doing all of your dusting. This tool has a replaceable brush.

Hose



Lightweight, flexible hose. Crush proof. It springs back to original shape. DO NOT store in an area where temperature exceeds 250°F.

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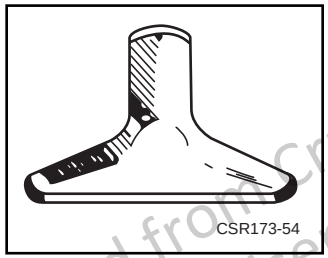
		Initial Setting (U.S. standard)	New Setting (outside U.S.)
AM	Frequency Spacing	10 kHz	9 kHz
	Frequency Range	530 to 1,170 kHz	531 to 1,629 kHz
FM	Frequency Spacing	200 kHz	50 kHz
	Frequency Range	87.9 to 107.9 MHz	87.5 to 1,629 kHz

Combination Fabric and Upholstery Tool



Use on interiors, curtains, upholstery, chairs and cushions.

Cockpit/Salon Stereo

AREA CHANGE

Use this function when you are using the boat stereo anywhere outside the U.S.

Switchable Frequency Spacing

This boat stereo is initially set to tune in frequency intervals of 10 kHz for AM and 200 kHz for FM , the standard calibrations in the U.S., use the following procedure to switch the frequency range. The table at the right lists the frequency specifications for the U.S. and other countries.

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Section 10 – Troubleshooting

TROUBLESHOOTING 10-2
Engine and Power Train 10-2
Electrical 10-5
Electrical Troubleshooting,
General Notes 10-6
Plumbing 10-8

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TROUBLESHOOTING

The following charts will assist you in finding and correcting minor mechanical and electrical problems with your boat. Contact your nearest authorized Cruisers Yachts dealer for problems and procedures requiring the skill of a trained service technician.

To correct a problem, first determine what the problem is. Then eliminate the simpler causes, working to the more complex causes.

Engine and Power Train

NOTE

For further troubleshooting information other than given here, refer to the engine owner's manual in the Skipper's Kit.

WARNING

Disconnect battery cables before making checks or adjustments around engine and electrical components. Personal injury or damage to the boat may occur.

PROBLEM	POSSIBLE CAUSE	SOLUTION
Engine will not start.	Fuel valves are closed or fuel tank is empty.	Check fuel valves or fill tank.
	Contaminated fuel.	Check fuel for contaminants or water. If fuel is contaminated, drain tank and lines, flush with clean fuel and replace fuel filters. See Cruisers Yachts Dealer for service.
	Loose wiring or bad key switch.	Look for any loose connections. Contact technician to replace switch if necessary.
	DC main and/or ignition circuit breakers are "OFF."	Turn all breakers "ON."
	Emergency Stop has been engaged.	**Caterpillar** – Reset by pulling out on the red knobs by the instruments between the engines.
Low starter speed.	Weak or bad battery.	Have battery tested or charged.

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PROBLEM	POSSIBLE CAUSE	SOLUTION
Starter will not turn engine crankshaft.	Corroded battery terminals.	Clean terminals.
	Loose wiring connections.	Clean and tighten all wire connections.
	Weak or discharged battery.	Charge battery.
	Defective starting switch.	Contact authorized dealer for switch replacement.
Lack of power.	Throttle not fully open.	See authorized dealer for throttle linkage adjustment.
	Contaminated fuel.	Drain fuel tank and lines; flush with clean fuel and replace fuel filters. See Cruisers Yachts Dealer for service.
Erratic engine speed.	Pinched or clogged fuel lines or tank vent line.	Replace line or remove obstruction. See Cruisers Yachts Dealer for service.
	Contaminated fuel.	Drain fuel tank and lines; flush with clean fuel and replace fuel filters. See Cruisers Yachts Dealer for service.
Engine overheats.	Engine cooling water seacock closed or water pick-up is blocked.	Open seacock or remove obstruction.
	Leaking or pinched water lines.	Repair or replace water lines. See Cruisers Yachts Dealer for service.
Transmission shift hard.	Corroded or pinched linkage.	Replace or lubricate linkage as necessary. See Cruisers Yachts Dealer for service.
Excessive vibration. NOTE: Some vibration is normal due to engine and prop action.	Foreign objects obstructing the propeller.	Remove objects from prop, shaft or rudder by reversing prop or cutting and pulling away obstruction.
	Bent prop or shaft.	Replace prop or shaft as necessary. Make sure prop is not pulled off shaft center by the prop key. See Section 8.

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PROBLEM	POSSIBLE CAUSE	SOLUTION
Excessive vibration. (continued)	Engine and shaft are misaligned.	Check engine and shaft alignment. Alignment must be within 0.003". See Section 8.
	Engine or transmission components touching a brace or some part of the hull.	Check engine mounts and components for proper alignment. See Section 8.
	Flexible shaft log “whip” is excessive and strikes the shaft hole.	Check shaft log for wear and avoid sudden torque changes. See Cruisers Yachts Dealer for service.
	Engine not timed properly or misfiring.	Have engine tuned-up by an authorized dealer.
	Bent rudder.	Replace rudder. See Cruisers Yachts Dealer for service.
	Worn strut, engine or transmission bearings.	Have bearings replaced by authorized dealer as necessary.
	Engine-to-shaft couplings out-of-round or off center.	Have couplings checked by an authorized dealer.
Poor performance.	Boat is overloaded or weight is badly distributed.	Reduce overload or distribute load evenly. Trimming the boat will also help.
	Material wrapped around the propeller.	Run prop in reverse or cut and pull material from prop.
	Damaged or use of wrong propeller.	Inspect propeller; replace as necessary. See Section 8.
	Boat hull has marine growth on it or hull is damaged.	Clean or repair hull as necessary. See Section 8.
	Excessive water in bilge.	Pump water out and inspect hull for leaks.
	Engine is misaligned.	Have engine alignment checked by an authorized dealer.

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Electrical

NOTE

For any troubleshooting information other than given here, refer to the individual component owner's manuals in the Skipper's Kit.

CAUTION

Never reset a circuit breaker which has been automatically tripped without first locating and correcting the problem.

PROBLEM	POSSIBLE CAUSE	SOLUTION
Electrical component will not function.	Circuit breaker in the tripped or "OFF" position.	If breaker is tripped, correct the problem and reset; otherwise turn circuit breaker "ON."
	Weak or discharged battery.	Charge battery.
	Loose or broken wire connection.	Connect or repair wire as necessary. Install plug in outlet.
Lights do not come on or are dim.	Circuit breaker in the tripped or "OFF" position.	If breaker is tripped, correct the problem and reset; otherwise turn circuit breaker "ON."
	Weak or discharged battery.	Charge battery.
	Loose or broken wire connection.	Connect or repair wire as necessary.
	Light bulb burned out.	Replace bulb.
Generator will not start.	Master battery switch in "OFF" position.	Turn switch "ON."
No power at AC outlets.	Ground fault circuit interrupter tripped.	Reset button on outlet and test. If reset button or light does not come on, DO NOT use any outlets. Have circuit checked by qualified technician.

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Electrical Troubleshooting, General Notes

This owners manual is designed for owner operation of the vessel. If it is necessary to do detailed electrical troubleshooting, contact Cruisers Customer Service at 1-800-743-3478 and request the necessary documentation, which could include schematics and harness drawings.

WIRING STANDARDS

The DC system wires are identified by three colors. Red wires are +12 volts, yellow wires are DC common and gray wires are DC control wires. Bonding wires are green. AC system wires utilize three colors. White wires are AC neutral, black wires are AC hot wires in 120 VAC systems and red wires are the ungrounded wires in 240 VAC power systems.

Individual harness wires are identified with wire number and function by lettering which is printed by an ink jet printer every three inches on the wires. This information aids in identifying wire functions for troubleshooting. Battery cables are identified by labels on both ends of each cable.

DC SYSTEM

The DC system nominal voltage is +12 VDC. DC common is connected to the engine/battery ground buss. The primary problem involved in most troubleshooting involves loss of power to the individual system. This can be caused because a circuit breaker is tripped. These circuit breakers can be identified and located in Section 4. If a circuit breaker is tripped it can be reset. If the circuit breaker trips immediately after being reset it is an indication that the circuit is overloaded. In this case it is necessary to determine the cause of the fault and to remove the cause of the fault before resetting the circuit breaker again. This determination should be done by a qualified service technician.

DC CIRCUIT BREAKERS

There are three DC circuit breaker panels in addition to the circuit breakers on the AC/DC panel. One is located at the dash, in front of the keypad. One is located adjacent to the AC/DC panel. The third panel is located in the engine room, on the forward bulkhead. The circuit breakers on the panel are:

DASH PANEL:
SPOT LIGHT, TRIM TABS,
12V RECEPTACLE AND GRAYHILL PANEL

AC/DC PANEL:
PME-2

ENGINE ROOM PANEL:
BLOWER MAIN, BLOWERS 1, 2 AND 3,
AUTO BILGE PUMPS FWD, MID & AFT
AND PME-1

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KEYPAD FUNCTIONS

The functions controlled from the keypad at the dash panel receive their power via the PME enclosures which are part of the Grayhill system. The functions which are controlled at the keypad are protected by circuit breakers which are part of the PME boxes. Each PME has the circuit breakers and its functions identified by labels on the PME box. If a function controlled from the keypad is not working properly, check the circuit breaker for that function on its corresponding PME. Refer to the DC schematic pages in the manual to identify the corresponding PME for the function in question. PME #1 is located in the engine room and PME #2 is located below the AC/DC panel.

AC ELECTRICAL SYSTEMS

The standard AC power system is 120/240VAC, 60 hertz. This allows the system to have two lines, L1 and L2, at 120VAC and also 240VAC. The AC power is controlled at the AC/DC panel. The boat owner should restrict control of AC power to the circuit breakers and switches on the AC/DC panel.

CAUTION

DANGEROUS VOLTAGES ARE PRESENT AT THE REAR OF THE AC/DC PANEL. THERE ARE NO OWNER SERVICEABLE COMPONENTS ON THE PANEL. SERVICE MUST BE PERFORMED BY A QUALIFIED SERVICE TECHNICIAN.

Circuit breakers are clearly identified and can be switched on and off. If a circuit breaker is tripped, it can be reset. If it trips again immediately it indicates an overload in the circuit. The source of the overload must be determined and corrected before the circuit breaker is reset for normal operation. Contact the Customer Service Department at Cruisers if electrical documentation is needed. Refer to the manuals furnished in the Skipper's Kit for troubleshooting information covering individual components.

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Plumbing

NOTE

For any troubleshooting information other than given here, refer to the individual component owner's manuals in the Skipper's Kit.

CAUTION

Never reset a circuit breaker which has been automatically tripped without first locating and correcting the problem.

PROBLEM	POSSIBLE CAUSE	SOLUTION
No water from cockpit washdown when turned on.	Seacock closed.	Open washdown seacock.
	WASHDOWN PUMP circuit breaker tripped or "OFF."	If breaker is tripped, correct the problem and reset; otherwise turn circuit breaker "ON."
	Washdown switch "OFF."	Flip switch to "ON."
	Strainer or hull inlet plugged.	Clean strainer or remove obstruction from inlet.
	Pump's automatic shut-off is defective.	Have washdown pump checked by authorized dealer.
No water at showers or sinks when faucets are turned on.	Freshwater tank is empty.	Fill freshwater tank.
	FR WATER PUMP circuit breaker tripped.	If breaker is tripped, correct the problem and reset.
	Pump is defective.	Have pump serviced by authorized dealer.
Low water pressure at all showers and sinks.	Water system has lost its charge.	Check for leaks in water system or air leaks in accumulator. See Cruisers Yachts Dealer for service.
	Weak or worn pump.	Have pump serviced by authorized dealer.
Low water pressure at only the shower or the sink.	Restriction or obstruction in water line.	Clean, repair, or remove obstruction from water line.

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PROBLEM	POSSIBLE CAUSE	SOLUTION
Shower sump overflows.	SUMP PUMP circuit breaker in the tripped or “OFF” position.	If the breaker is tripped, correct the problem and reset; otherwise turn circuit breaker “ON.”
	Discharge lines blocked or pinched.	Remove obstruction or straighten line.
	Pump or automatic switch is defective.	Have pump or switch serviced by authorized dealer.
Head will not flush.	HEAD PUMP circuit breaker in the tripped or “OFF” position.	If breaker is tripped, correct the problem and reset; otherwise turn circuit breaker “ON.”
	Low battery charge.	Charge the batteries.
	Flush water seacock not open.	Open seacock.
	Inlet pedal valve not working.	Have head serviced by authorized dealer.
Head will not empty.	“Y” valve not open or line to holding tank is blocked.	Open “Y” valve or remove obstruction.

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A DIVISION OF KCS INTERNATIONAL, INC. LIMITED WARRANTY

REGISTRATION OF PURCHASE: The "Federal Boat Safety Act of 1971" requires all boat manufacturers to maintain a record of all first retail purchasers and their current address for the purpose of notification in case of defective parts or equipment, or in case of non-compliance with standards or regulations set forth by this act. Failure to complete and return your factory warranty card for our records will waive your right to notification of defect and/or repair at manufacturer's expense. **THIS LIMITED WARRANTY CAN BE ACTIVATED ONLY BY SUBMITTING THE "LIMITED WARRANTY REGISTRATION CARD" TO CRUISERS YACHTS WITHIN THIRTY (30) DAYS OF THE DATE OF PURCHASE.**

WARRANTY COVERAGE: CRUISERS YACHTS, a division of **KCS INTERNATIONAL, INC.**, warrants to you, Consumer, subject to the limitations and exclusions described below, that those parts of the new boat manufactured by **CRUISERS YACHTS**, and purchased from an authorized Cruisers Yachts dealer, are free from defects in material and workmanship under normal use and service. The duration of this warranty is as follows: (1) The structural sections of the hull and deck for a period of 5 years beginning the date of delivery to the first consumer. (2) As the other parts and components manufactured by **CRUISERS YACHTS** for a period of 1 year beginning the date of delivery (except for exclusions listed below). (3) **CRUISERS YACHTS** warrants the gelcoat finish below the waterline against blistering for a period of (3) three years from the date of sale, provided that the boat is maintained annually and records are forwarded to the Cruisers Yachts Service Department annually.

WARRANTY CLAIM PROCEDURES: If a defect is discovered during the applicable warranty period, Consumer must promptly notify the selling dealer (or **CRUISERS YACHTS**) of such in writing. In no event shall such notification be received by the dealer (or **CRUISERS YACHTS**) later than 30 days of the discovery of the defect. All warranty claims must first be made to the dealer from whom the boat was purchased. The dealer will contact **CRUISERS YACHTS**, who at that time will determine whether the defect is covered by this limited warranty and advise the dealer. For warranty service the boat must be returned to the selling dealer or if determined by **CRUISERS YACHTS** to our factory. A boat may not be returned to the factory unless prior written authorization, in accordance with instructions set forth in **CRUISERS YACHTS** return authorization, from **CRUISERS YACHTS SERVICE MANAGER**. Transportation, preparation, disassembly and reassembly cost to and from the dealer or **CRUISERS YACHTS** will be the responsibility of the owner.

REMEDY: Within a reasonable time after notification, **CRUISERS YACHTS** will repair any defect in materials or workmanship or at its option, correct such defect by replacing nonconforming goods or parts. Such repair and/or new parts are warranted for the unexpired portion of the original warranty, or for 90 days, whichever is longer. Warranty work (parts and/or labor) shall be at **CRUISERS YACHTS** expense. These remedies are the Consumers exclusive remedies for breach of warranty.

LIMITATION AND EXCLUSIONS: This warranty applies only if the boat is used under noncommercial normal use and service, and shall not apply to the following: (1) Boats subjected to negligence, abuse, misuse, or accident. (2) Boats subjected to improper operation, trailering, maintenance or storage, commercial use or use for purposes other than those for which the boat was designed. (3) Defects or damages caused by a force or impact which exceeds design specifications, including but not limited to, exposure to harmful solvents and electrolysis. (4) Defects or damages caused by unauthorized attachments or modifications. (5) Any statements, representations or warranties given by dealers or third persons other than those provided within this warranty. (6) Any unit which is part of a rental fleet, used for racing or commercial purposes. (7) The following consequential damages: (a) loss of time, (b) inconvenience, (c) towing charges, (d) expenses for travel, lodging, telephone and fuel, (e) loss or damage to personal property or loss of revenue, (f) loss of use of the boat, (g) haul out, launch, lift charges. (8) This warranty specifically does not apply to engines, stern drives, IPS, transmission, generators, propellers, improper adjustment of controls, adjustment or realignment to any components including, but not limited to the drive train, and any other parts expressly warranted by the manufacturer thereof. (9) Also excluded are gelcoat crazing, gelcoat stress cracks, gelcoat fading, stainless steel hardware, windshields, glass breakage, all vinyl upholstery, cockpit seat wood, acrylic top enclosures, carpet, electronics, light bulbs, gauges and other equipment or accessories manufactured by manufacturers other than Cruisers Yachts, which are separately warranted by such other manufacturers (appropriate adjustments therefore being provided by their respective manufacturers). (10) Any published or announced catalog or performance characteristic of speed, fuel and oil consumptions and static or dynamic attitude in the water. (11) Cruisers Yachts shall not be effective or actionable if any repair or replacement work is performed by any unauthorized party. (12) Boats manufactured with Cruisers Yachts applied ablative bottom paint does require re-coating based on the region your boat is operated in. Re-coating is a responsibility of the owner.

THE FOREGOING WARRANTIES ARE EXCLUSIVE AND IN LIEU OF ALL OTHER EXPRESSED WARRANTIES, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANT ABILITY AND FITNESS FOR A PARTICULAR PURPOSE, DO NOT EXTEND BEYOND THE DURATION OF THE EXPRESS WARRANTIES PROVIDED HEREIN.

IN NO CASE SHALL CRUISERS YACHTS BE LIABLE FOR ANY SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES BASED UPON BREACH OF WARRANTY, BREACH OF CONTRACT, STRICT TORT, OR ANY OTHER LEGAL THEORY. THIS LIMITATION DOES NOT APPLY TO CLAIMS FOR PERSONAL INJURY.

SOME STATES DO NOT ALLOW THE EXCLUSION AS LIMITATION OR INCIDENTAL OR CONSEQUENTIAL DAMAGES OR LIMITATIONS ON HOW LONG AN IMPLIED WARRANTY LASTS, SO THE ABOVE LIMITATIONS OR EXCLUSIONS MAY NOT APPLY TO YOU.

TRANSFERABILITY: All rights and terms of this limited warranty may be transferred to new owners of the covered product by completing a **TRANSFER OF WARRANTY FORM** and submitting a written request to Cruisers Yachts and accompanied by a $150.00 payment to Cruisers Yachts.

THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS AND YOU MAY ALSO HAVE OTHER RIGHTS WHICH MAY VARY FROM STATE TO STATE.

CRUISERS YACHTS reserves the right to improve its products through changes in design and/or material without being obligated to owners of boats of similar or the same model prior manufacture.

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Printed in U.S.A.